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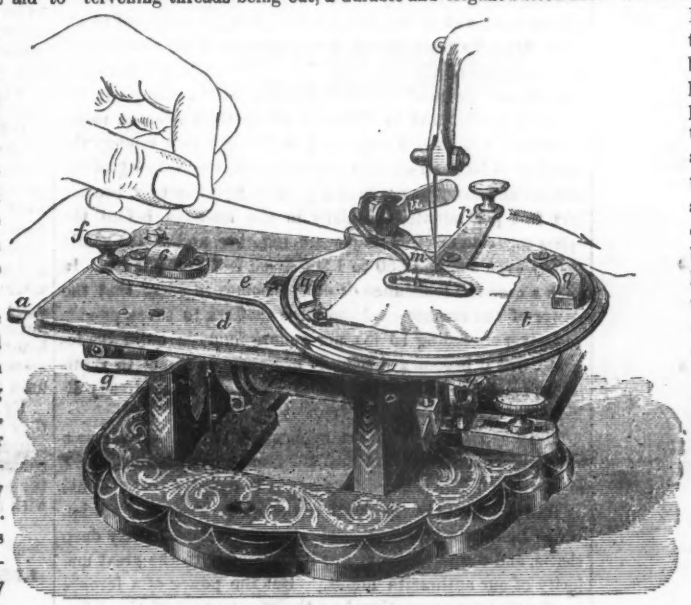
IMPROVEMENTS IN SEWING MACHINERY—WHEELER & WILSON'S BUTTON-HOLE ATTACHMENT.

It is somewhat difficult to chronicle, in any thing like detail, the varied improvements which succeed each other with something akin to marvellous rapidity in the great industrial field of sewing machinery. It is only when some more than usually novel and useful invention, which enlarges the sphere of its operations, or performs some task long considered half impossible of accomplishment, that the public interest is specially attracted to the rapid strides which this great aid to human progress is making in the world. The latest, and by no means the least of these remarkable imporvements is one recently added by the WHEELER & WILSON Manufacturing Company to their heretofore generally conceded almost perfect machine. With its varied appliances entering into so many details of sewing, this machine well challenges successful competition; but with true appreciation of what was needed to retain the foremost position, the Company have ever been tireless in increasing its efficiency, and in their last addition have indeed made a great stride towards absolute perfection.

The improvement is an "attachment" to or change of the regular machine by which it can be easily and quickly altered to make button-holes. To one even well acquainted with the common use of a sewing machine, running its endless lengths of straight seams, any change which, without destroying its efficiency for its regular task, would fit it for another and so desirable a work as making a button-hole, might readily seem chimerical, but this the WHEELER & WILSON Co. have succeeded in accomplishing, and with appliances beautifully simple and safe of adjustment. The button-hole made by it is in form such as is commonly used on all under garments, dresses, etc., where an eyelet or rounded end is not absolutely required. It can be made on any fabric and with all kinds of thread. The appearance of the attachment when placed upon the sewing-machine is shown in the cut at the head of this sketch.

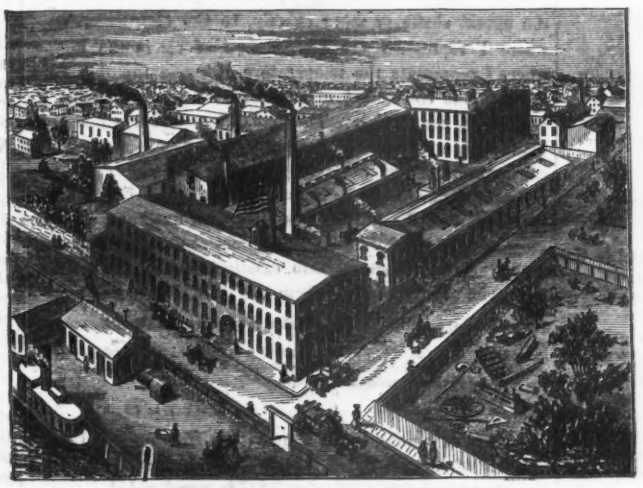


VIEW OF ATTACHMENT READY FOR WORK.

In preparing the sewing machine for the attachment, the stationary arm, cloth-plate, feed-bar and spooling-spindle are first removed. Into the hole from which was taken the spooling-spindle, another spindle, holding a cam, *a*, with a double *v* channel cut in it, and four pins fastened in its side, is screwed. A skeleton-plate, *d*, having on the under side such simple mechanism as is required to produce the necessary motions, is put on in place of the cloth-plate. Upon this two other plates, fastened together (*e* and *t*) to the first of which is attached a feed-screw, *r*, are fastened. These changes effected, the attachment is ready for its work. As shown in the cut, the work in which a hole is to be made is secured without cutting, upon the plate, *t*, by a clamp, *m*, which has a slot, *l*, through which the needle descends into the cloth. The mode of obtaining the loop or stitch is the same precisely as in ordinary sewing, but by means of the screw, *r*, which has a pinioned head working under the cap bearing 6, and acted on by the pins fastened on the side of cam, *a*, the clamp-plate, *t*, on which the fabric is fastened, is driven forward under the needle at regular intervals, by aid of a spring nut, *g*, which bears upon the screw. As the needle rises from the cloth, after taking a loop or stitch, a vibrating or zig-zag motion is communicated to the plates, *e* and *t*, through the cam, *a*, operating on a lever, *g*. This motion pushes the fabric such distance as is required, so that the needle, as it again descends, enters the cloth at a point opposite that in which it first entered, making, to appearances, two lines of holes. Thus, moving forward by means of the screw and vibrating at each descent of the needle, a line of beautiful double stitching, under which a cord or bar is laid, forms on one side the proposed hole. When this side is finished to the required length, the clamp-plate is turned half round, by moving the lever *p*, and the lever *g*, being pulled out, the vibrating motion of the plate is doubled. The stitch from side to side being thus made twice the width of the first line formed, the end of the button-hole is barred or whipped in the same manner as by hand. The lever, *g*, is then pushed in and the clamp-plate, *t*, is driven by the screw in a parallel direction alongside the first row of stitching until the needle, making a corresponding line to the first, reaches the point of starting. By means of the lever, *p*, the clamp-plate is again turned half round; the lever, *g*, is pulled out and this end of the hole barred in a manner similar to the other. The threads, being cut, and the work removed, it is found that two beautiful lines of stitching, lying closely together, strongly barred at the ends, and resembling a hand button-hole stitch, have been made. A cutter or knife, specially designed for this service, and patented, is then inserted between these lines, and the intervening threads being cut, a durable and elegant button-hole is formed. This description will give the general reader some idea of the manner in which the hole is made, but only actual inspection will enable any one to understand the rapidity, exactness, and beauty of the operation.

The efficiency of the machine for general work is in no way impaired. When the button-holes required are made, a few minutes work will change the machine back to its original form.

From eight hundred to one thousand button-holes, an inch each in length, can be made in a day.



HEWES AND PHILLIP'S IRON WORKS.

EXTENSIVE IRON WORKS.

In the thriving city of Newark, N. J., may be seen some extensive works well worthy of a visit, and full of interest to manufacturers and those who take pleasure in witnessing mechanical operations. From among these we have selected for illustration the engine and machine works of Messrs. HEWES & PHILLIPS as being a well regulated and well known establishment in that locality. The works comprise foundries, pattern and pattern-makers' rooms, blacksmith and machine shops, &c., and are situated at the corner of Orange and Ogden streets, where their extensiveness makes them at once conspicuous. The cupolas in the foundry were constructed by Messrs. Bement and Dougherty, of Philadelphia, and are capable of melting metal for a sixteen tun casting. When the work is not plentiful and no large castings required, a smaller foundry and cupola are used. The pattern-shop, containing many hundred patterns of engine and machine works (among which were a great many handsome spur and bevel gears,) was a pattern-shop in a double sense, for we have seldom seen patterns so excellently arranged and systematized as they are at these works. The pattern-makers' room at these works is of good size, being ninety feet by twenty-nine feet.

Entering the machine shop the visitor at once sees the remarkable order and neatness throughout the bright and well finished machinery, all made on the premises; the powerful planers, one of which will plane a piece thirty-six feet long by five feet square; the slotting, shaping, and drilling machines; the large and powerful lathes, among which is one that will turn from twelve to twenty diameter, and can turn a piece weighing forty tons. A handsome beam steam-engine is built here of a novel and neat design. The beam is of cast iron, with a web similar to the English beam engines; the side columns and frames for the beam pedestals are ornamented with an imitation of lattice-work. The steam and exhaust valves are puppet valveswith a cut-off, patented by J. L. Hewes, April 24, 1866, and are controlled by the governor. The steam engine which drives the machinery in the works is one of this description, and is sixty-five horse-power. It requires but 1,700 pounds of coal for ten hours work. There are no less than twenty-six cranes in the machine shop, and nothing is left undone which conduces to the comfort of the employees, the accuracy of the work, or facilitates the manufacture of first class engines, tools, and machinery.

A Useful Tree.

In China there grows a tree known as the Grease Tree. It is said that large forests of this vegetable lubricant are to be found there, and they form the source of a considerable local traffic. This tree not very long ago was imported into India, and it is said that the experiment of cultivating it there has proved quite successful. In the Punjaub and north-western provinces generally it grows as rapidly and as vigorously as in its native soil, and there are already thousands of trees on the government plantations, yielding tons of seed, admirably adapted to a variety of commercial purposes. Dr. Jameson, a chemist in the Punjaub, has prepared hundredweights of grease from this particular tree, and has forwarded on trial a portion of it to the Punjaub railway, to have its qualities tested in a practical manner, as lubricating material for those parts of the machinery constantly exposed to friction. The grease thus obtained forms an excellent tallow, burning with a clear, brilliant, and, what is infinitely more to the purpose, a white light, and at the same time emitting not a trace of any unpleasant odor, or of the ordinary disagreeable accompaniments of combustion—smoke.—*Ex.*

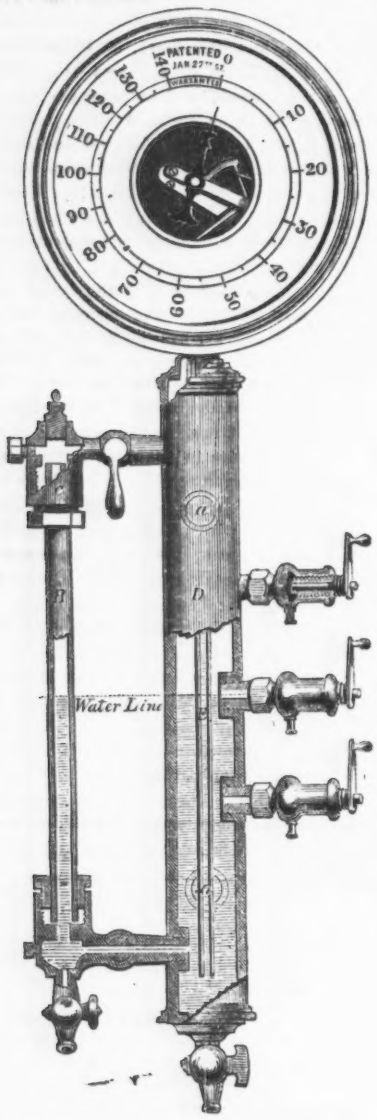
Placer Mining by Steam.

The Montana *Post* describes a method of working placer mines by steam machinery, that cannot fail to interest many of our readers. Machinery on the plan described was recently completed, and is now in successful operation in one of the gulches adjacent to Helena City. We believe the method to be entirely new. The *Post* says:

"A ten-horse power engine drives the whole machinery, which is nothing more than a huge windlass, hauling two cars over two separate tracks, 135 feet long, up an incline with a grade of 33 feet to 100 feet, to an elevation of 45 feet above the gulch, to which point 70 inches of water are brought in a flume. The elevation attained permits the string of sluices to be set at a grade of eight inches to every sixteen feet, affording ample room for dump. At the present time the average hourly number of car loads, each containing 1,500 pounds, is thirty-two to both tracks. As soon, however, as more cars and the necessary turn-tables are erected, one car load per minute wil be the average."

STEAM GAUGES.

Previous to the introduction of steam pressure gauges, a safety valve was nearly the only device in use for testing the force or pressure of steam in a boiler, and as this valve was generally fixed to indicate limited pressure, beyond which steam was not to be carried, very little was known about the actual pressure in the boiler till blowing off the steam gave evidence that the limits of the safety valve were reached. Long experience has proved that this method of testing the pressure of the steam in the boiler was very unreliable, and even after various alterations were made, and precautions in construction and management adopted, the apparatus was nothing more than a means of preventing the pressure of steam in the boiler exceeding certain proposed limits, being utterly inoperative as a means of showing the actual pressure in the boiler at any given moment. The improvement of mercurial steam and vacuum gauges was followed by the introduction of metallic gauges, many of which, from the little



COMBINED STEAM AND WATER GAUGE.

attention they require, appear to be very well adapted to the purpose for which they are intended, but like other delicate apparatus, they are liable to become defective. When gauges err, they cannot be relied upon at all; an erroneous gauge may continue to show the same reading during the extreme variations of the pressure on the boiler, or it may vary in the most irregular manner; hence the absolute necessity of testing the accuracy of steam gauges from time to time. We are constantly reminded of this necessity by the accounts of boiler explosions and by the employment of incompetent engineers who are utterly ignorant of mechanical details.

Messrs. McNAB & HARLIN, 86 John street, N. Y., manufacture a simple machine which may be termed an hydraulic press for testing gauges. It consists simply of a tube being filled with water, on the surface of which is a piston, that, by means of a connected screw and handwheel, is raised or lowered at pleasure. From this tube are pipe connections for two gauges. One standard gauge is permanently fixed to the hydraulic press, and when the gauge to be tested is connected, a pressure is put on by screwing down on the water piston; any discrepancy will be shown by the indications on the gauges. The device is simple and efficient, and should be in the possession of all engineers. Another very useful apparatus manufactured by the same company is represented in the annexed engraving. It consists of a combined steam and water guage for locomotive marine, or stationary engines.

a a are unions, connecting cylinder *D* to boiler. *B* is a glass tube, for showing height of water in boiler. *C* packing box for glass tube. *D* cylinder connected to boiler by unions *a a*. *E* pipe connected to steam guage forming a syphon.

In fixing this gauge on the front of the boiler, the middle gauge cock should be on a line with the desired height of the water in the boiler; it may be carried a distance from the boiler by connecting pipes, and keeping the gauge on the same line.

☞ A telegram from Lake City, Florida, gives an account of a singular phenomena in Hamilton county, in the northern portion of the State. A few days ago nearly 100 acres of land on a farm sank suddenly to the depth of about fifty feet below the surface of the surrounding earth. The immense vacuum thus formed almost immediately filled with water, submerging the tops of the tallest trees. At the last account the land was still sinking, an area of four acres having disappeared. The streams and creeks lose themselves in the surrounding country, which forced an outlet in this way. These sinks occasionally occur, but the present one is the largest and deepest ever known

Practical Letters.

[WRITTEN FOR THE AMERICAN JOURNAL OF MINING.]

Relative Economy of Some of the Machines Used in the Ventilation of Coal Mines—No. III.

BY R. P. ROTHWELL, M. E., WILKESBARRE, PA.

[Concluded from page 354.]

The actual amount of air which it is necessary to circulate through a mine in order to have good ventilation, depends on a variety of circumstances, and cannot be determined with any degree of exactness without consulting these. In order to mix and carry off the noxious gases, resulting from the respiration of the men, etc., in a mine which does not produce fire-damp, the air should have a velocity in the working places of at least 30 lineal feet per minute—that is, a current which will slightly deflect the flame of a candle. In a mine of moderate extent and with an average size of air courses, this will correspond in practice to about 100 cubic feet per minute per man, and say 500 cubic feet per minute per horse employed in the mine, these figures would represent a very small amount of air; but in cases where there are old workings to be ventilated it has to be largely increased, while in mines giving off fire-damp, carbonic acid, or other deleterious gas in large quantity, the amount of air required may be 400, 600, or even more cubic feet per minute per man. Where the air courses are large even this amount may be circulated without exceeding a velocity of 200 to 300 feet per minute in the air-courses; and in fact this is a limit it is inconvenient to exceed, since the resistance to the circulation of the air increases as the square of the velocity. Nevertheless, in mines requiring a large volume of air, or in working small veins (as in the north of France and in Belgium where their average thickness does not exceed two feet,) where the cost renders the opening of large air-courses impracticable, the velocity of the current necessary to produce a good ventilation may become 500 feet per minute, especially in the air-ways before the splits separate or after they come together, and in the shafts it may even attain 1,500 to 1,800 lineal feet per minute. In such a case the resistance or drag becomes so great that the power of the furnace—seldom more that six to seven pounds and never exceeding 13 lbs. per square foot—is quite inadequate, and it becomes absolutely necessary to resort to ventilating machines such as those to which we have already alluded.

The *economic limit* to the application of the furnace as a ventilator, does not by any means extend to its limiting *power* or *capacity*. The power of a furnace is directly proportional to the square root of the depth of the upcast shaft, a condition which limits its practical application to comparatively deep shafts, and consequently makes it unadapted to the great majority of our anthracite mines. But the power of a furnace is also directly proportional to the square root of the difference in temperature between the air in the downcast and in the upcast shafts, or more exactly, to the expression $V\frac{T-t}{1+at}$ where T represents the temperature of air in the upcast, where t represents the temperature of air in the downcast, and a is the co-efficient of expansion of air (=0.002 of its volume at zero Fah.). This condition would allow wide limits within which to apply the furnace, were it not that the consumption of fuel *increases nearly as the cube of the temperature of the air in the upcast;* the economical limit to the application of the furnace has thus been fixed at a temperature of 110° to 120° Fah. in the upcast shaft. The following figures show the disproportion existing between the cost and the useful effect obtained where this limit is exceeded:

For a temperature of 86° Fah. the number proportional to the velocity of the current is 43.
For a temperature of 104° Fah. the number proportional to the velocity of the current is 51, and the number proportional to the fuel consumed 153.
For 122° Fahr. these numbers are respectively 58 and 232
For 140° " " " " " 64 and 320
For 212° " " " " " 79 and 711 (Burat.)

So that in increasing the temperature from 50° to 212° the quantity of fuel consumed is increased from four to five-fold, though the quantity of air circulated is not doubled.

Besides the condition that the upcast shall have a considerable depth, the fact that the air courses shall be very large, in order to allow a sufficient volume of air to be circulated at a slight velocity, and that in mines producing fire-damp the use of the furnace is always attended with more or less danger, even where most expensive precautions have been taken to render it safe, and that, when most required—after accidents—the furnace is capable of but a very slight increase in its work. These are the considerations, and not the legal enactments, which apply to mines producing fire-damp (grison), nor yet "the moderate depth" (*sic*) of their mines, which have induced the French and Belgian engineers to prefer mechanical ventilators, as much more economical, safe and efficient than the furnace. The steam jet failed so signally in economy and efficiency that it is entirely rejected.

We may note, *en passant*, that several of the Belgian mines have attained the *moderate* depth of 2500 feet, and that at the Viviers Réunis 3411 feet, being the deepest mine in the world. The deepest pit in England is the Dunkenfield, which is 2058 feet.

The advantages claimed for the furnace are: 1. A smaller cost of establishment; 2. A less liability to derangement; 3. That it can be fed with the slack or waste coal.

In mines producing fire-damp, the precautions necessary to render the furnace safe bring its cost *above* that of a mechanical ventilator in the great majority of cases; in shafts with cast iron tubbing, (now quite common in Europe), the action of the furnace gases (combined with water) so corrode the iron that it is found necessary to line the shafts with wood—an additional item of expense. We consider the second claimed advantage as not being by any means proved. A well constructed fan is but very little liable to stoppage, and is quickly repaired after accidents. The third advantage is rapidly losing force, as the manufacture of the "slack" or "waste coal" into "patent fuel" increases, and in nearly all the mine furnaces of this country it is good "lump coal," and not "slack," which is used.

While it is highly desirable that the size of the air courses, the general plan of the works, and the division or splitting of the air current shall be so arranged that the power of the furnace may be sufficient to produce a good ventilation; yet such a condition can be obtained, in many cases, as we have have seen, only by an expenditure which renders it impracticable; and, as mines become deeper and more extensive, the resistance to be overcome by the air increases, and the advantages of mechanical ventilators over the furnace will become more and more marked, till, in the not very distant future, this latter will assuredly be replaced generally, even in England, by the former.

Among mechanical ventilators, the air pump (E. G. MIXON'S) is capable of moving the largest volume of air. Several of of these, and also of STRUVE'S, have given good results, their greatest inconvenience being the movement of so great a number of valves. The various forms of fans obviate this inconvenience, and though none of them are capable of moving so large a volume of air, yet, in general, they have been found the most efficient ventilators we have. It is still an open question as to whether the exhausting, or the forcing ventilator is to be preferred. The French and Belgian engineers generally agree that the forcing ventilator is the most economical as regards the expenditure of power, and it is claimed as being less liable to accident in mines containing fire-damp, since an explosion would naturally be more destructive in the upcast than in the downcast, where the air is pure.

It has been noticed in fiery mines that the amount of gas discharged varies with the barometrical pressure, the quantity increasing as the pressure becomes less, hence it would be natural to suppose that the quantity of gas might be somewhat more abundant where ventilation was effected by exhaustation, at least where the tension is great. But as accidents are to be feared mostly when the ventilator has stopped, and as this would tend to *increase* the pressure (in order to attain the same pressure as the exterior atmosphere,) in a mine using an exhausting engine, and to *diminish* it where a forcing ventilator is used, it appears probable that the exhausting ventilator would prove the safest; they are also in more general use in the European mines, and are the only kind to be found in this country.

By simply increasing the speed of any of these ventilators they are capable of largely increasing their ordinary working capacity. This, and the very great resistance they can overcome, renders them exceedingly valuable after explosion, when the air-courses are usually obstructed, and the mine is filled with deadly after-damp.

[WRITTEN FOR THE AMERICAN JOURNAL OF MINING.]

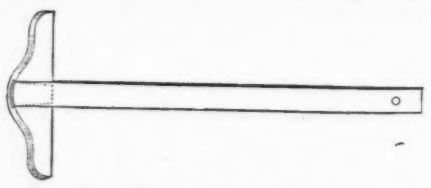
LESSONS IN MECHANICAL DRAWING—No. III.

BY T. P. PEMBERTON.

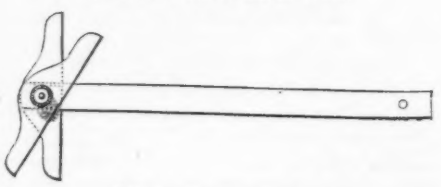
THE T SQUARE AND TRIANGULAR PIECES.

These are indispensable in architectural and mechanical drawing, and meet with considerable attention from draftsmen. They have to be made of the best material, and in the most accurate manner. The square is named a T square from its resemblance in shape to the letter T, and may be constructed of different kinds of good seasoned wood, as pine, apple, pear, mahogany, ebony, and rosewood. The only objection to pine is its softness and its susceptibility to indentation from the slightest knocks. Good Spanish mahogany or fine rosewood makes a handsome, durable instrument, which, if properly fitted and accurately made, will always give satisfaction. Sometimes three or more different kinds of wood are introduced in the same instrument, as, for instance, when slabs of mahogany, baywood and black walnut are glued together in one block and then sawed into pieces suitable for squares. The French make excellent instruments from white hard wood, and introduce thin strips of sheet brass into the edges of the parts known as the blade, back and bevel piece; these keep straight and true for a long time. A good proportion of the parts is to have the back, which is the part that slides against the edge of the drawing board, and is held in the left hand, one-third the length of the blade; the latter piece should be the length of the board which we have already mentioned, must be made to suit the drawing paper. A T square suitable for "double elephant" paper and the drawing board, previously described, may be made to the following dimensions: length of blade, 42 inches; length of back, 14 inches; thickness of blade, 5-32 inch; thickness of back, ⅜ inch; thickness of bevel piece, ¼ inch.

The edges of the blade should be perfectly straight and square with the back: the bevel piece is held in its place by a small brass bolt, with a circular milled nut that holds it in whatever position is desired. The annexed engraving repre-



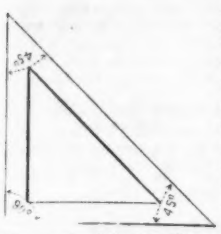
T SQARE WITHOUT BEVEL PIECE.



T SQUARE COMPLETE.

sents a T square made in a novel manner which admits of the parts being detached at pleasure. It will be observed that on the underside of the back end of the blade, there is a wedge-shaped key beveled on its edges, and this fits into a similarly beveled recess in the back. When the loose bevel piece is used with this description of square, the face of the blade and inside surface of the back, are "flush." A slight tap of the hand either securely keys or detaches the blade and back. The advantages of this arrangement are, that the blade can be used at any time as an ordinary straight edge, and the edges can be always "trued up" by the plane; this cannot be done when the blade is dovetailed and glued into the back, which is the usual mode of construction.

TRIANGULAR PIECES



are used with the T square, and are exceedingly useful. They should be made of the same thickness as the blade of the square and of the same well-seasoned hard wood, six or eight inches long. The common method of making the sides separate and gluing them together, is objectionable. The illustrations of these pieces show no joints, and are intended to reprerent the triangles as they should be made. The angles 90°, 60°, 45°, and 30°, are those that frequently occur in mechanical drawing. With the T square and these two triangular pieces, all straight lines in a drawing can be made whether they be horizontal, perpendicular, or oblique; parallel lines are easily ruled, circles can be divided into six or twelve points, without recourse to the dividers, and the triangular pieces are especially useful in drawing angles, and in the delineation of sections, hexagonal nuts, bolt heads, wheels-spur, and bevel gearing.

TO BE CONTINUED.

Mining Summary.

California.

Gleanings from Ross Browne's Report.

THE PRINCETON MINE IN MARIPOSA COUNTY.

The Princeton mine has been one of the most productive in California, and has been noted for both the abundance and the richness of its quartz. For a time it yielded $90,000 per month from milling rock, and this is more than any other mine of the State ever did.

The mine is situated about half way between the Mariposa and the Pine Tree mines, and is on a hill easily accessible. The course of the vein is northwest and southeast; the dip 55° northeast; the thickness varies from a few inches to ten feet. The vein has been opened to a depth of 560 feet on an incline, and 100 feet below the surface; drifts have been run 1,200 feet along the vein, and at the deepest workings the drifts extend 500 feet. The richest rock was found within 100 feet of the surface, where the pay was $70 per ton from milling well, besides large numbers of specimens, of which it is said that not less than $100,000 in value were stolen by the miners. Below this rich mass of rock the quartz gradually became poorer, and there were spots which did not pay for working; but it is said that there is still an abundant supply of good milling rock in sight.

Prof. W. P. Blake made a report on the mine in November, 1861, and said:

"The vein is composed of white friable quartz, and is divided into parallel layers or plates by thin slatey films, which are generally charged with fine-grained pyrites and free gold. The body of the quartz bears white vein pyrites crystallized and spread in irregular patches and a small portion of galena, together with free gold in irregular ragged masses, in plates and scales, and sometimes crystals. The gold appears to be most abundant in the neighborhood of the galena, and is found not only with the iron pyrites striking its sheets through its substance, but entirely isolated from it and enveloped in the pure white quartz. Some of the specimens preserved are exceedingly rich and beautiful, and just before my examination of the vein, some superb crystallizations had been broken out. These crystals are bunches of octahedrons, with perfectly flat and highly polished faces from one-eighth to three-sixteenths of an inch across and are attached to masses of white quartz."

Near the mill the vein splits and the two branches run off southeastward nearly parallel with one another. At a distance of a mile they are about 300 yards apart. These branches have not been well explored or prospected, so not much is known of their character. On the main vein there are seven shafts and a great number of workings of different classes, such as might be expected of a mine that has yielded $4,000,000 and sustained a considerable town. From January, 1859, till June, 1860, Steptoe and Ridgway had charge of the mine, and extracted 2,000 tons, which averaged $18 per ton. From June 1, 1860, till November, of the same year, under the management of Park, 23,916 tons of quartz were crushed, yielding $527,633, an average of $22 25 per ton. In 1862 and 1863 the production was 121,000 tons of quartz, and $2,000,000 of bullion, averaging $16 50. In 1864 the yield of bullion was $243,707. In 1865, when the mill was working rock which yielded $53, the tailings, according to assay, contained $13 56 per ton. The pay was distributed rather in an irregular mass than in a chimney; but Prof. Blake expressed the opinion in his report of 1864, that there was a chimney, and its dip was 18° to the horizon.

The Princeton mill has twenty-four stamps, and is the smallest on the Mariposa estate, at least of those owned, erected, and worked by the Mariposa company. The capacity of the mine far exceeds that of the mills, and while the former was in a productive condition much of the ore was sent to other mills. The gold in the quartz is coarse and is easily caught in the battery, or at least most of it; but the assays of the tailings show that great quantities of it were lost. The heap of tailings at the mill is immense, and will no doubt be worked over at some day with profit, if not all blown away. The sand being fine, many pounds of it are carried off every hour when the wind blows in summer. The mill was driven by steam. The stamps weigh 550 pounds, and made seventy drops per minute. Both mine and mill are now idle.

The Mariposa mine is situated on the eastern border of the town of Mariposa, on the Mariposa lode, the direction of which is nearly east and west, the dip 51° south, and the width of the main vein from four to eight feet. Near the mill the vein forks, one prong running westward in the line of the main lode, and the other running north of west. At a distance of 300 yards from the forks, the two prongs are not more than sixty yards apart. Each fork is about three feet thick. The rock is a white ribbon quartz; the walls are a black talcose slate. There is but little gouge, and the quartz is so hard that little progress can be made without blasting. East of the fork the gold is in fine particles, and is evenly distributed through the pay chute, while west of the fork the gold is collected in rich pockets, which are separated from one another by large masses of very poor quartz. These pockets contain almost invariably arsenieurets of iron, accompanied by pyrites. The presence of these minerals is considered a certain sign that a good deposit of gold is not far distant. One pocket paid $30,000, another $15,000, and numerous other sums varying from $100 to $1,000. The great richness of the vein is proved by the facts that the decomposed quartz at the surface was worked or washed for a distance of half a mile, the ravines immediately below the lode were famous for their richness, and drifts have been run a quarter of a mile under ground. It is said that before Fremont obtained possession, squatters took $200,000 from the mine. The quartz taken out in 1864 averaged $25 per ton; but afterwards the average yield was only $11. Persons familiar with the mine say an abundance of rock might be obtained to yield $12 or $15. Before the sale of the grant to the Mariposa company the mine was leased to Mr. Barnett, who paid 10 per cent. of the gross yield, a very good share, and afterwards when he was told that he could not have the property on those terms, he offered to pay 30 per cent. of the gross yield, and to give good bonds. His offer was rejected and the mine is now idle. Mr. Barnett worked the mine on a very economical plan. His stamps had wooden stems; he amalgamated in arrastras, and his mortar was fed from a hopper or self-feeder. Little hand labor was done in the mill in the daytime, and none at all in the night. Indeed, everybody left the mill at supper time, and it was allowed to run without supervision till morning. The quartz was taken out under Barnett's directions, who, having spent many years at the place, was thoroughly familiar with it; and before going to the mill all the barren pieces were rejected. It was supposed that the mine would pay better if it were worked on a larger scale, so the mill that had stood at the Green Gulch mill of forty stamps was moved to the Mariposa mine in 1864, in accordance with the recommendations of Prof. Ashburner.

Professor Silliman, in a report made in May, 1864, said:

"I feel convinced that the Mariposa vein is, on the whole, the most remarkable auriferous vein yet discovered on the Mariposa estate, and if the half which is believed of it by those who know it best should prove true, it will alone almost sustain the estate. The mill now erecting in Mariposa creek is the same which has been removed from Green Gulch, where, as it proved, there was no further use for it. Mr. Ashburner having examined and reported approvingly on this removal, I have not felt it needful to re-examine the evidence, the decision undoubtedly being a wise one. The fault of the other mills (except the Princeton,) of being set too low has been remedied here, and with a well-considered system of amalgamation, there can be no doubt that excellent results will be arrived at in working the mill in its new and well chosen position, nor can there be any doubt that the mill will receive an ample supply of quartz to engage it fully in crushing."

MINING IN TUOLUMNE COUNTY.

Tuolumne county is very favorably situated for quartz mining, and so far as external indications and facilities may servee as guides, the presumptions are that it will be second to no other county in California in production of quartz gold. Wood and water are abundant; the roads generally good, and the quartz veins large, numerous and easily traced. The mother lode and the companion talcose vein here have their largest and most regular development. The Golden Rule, the Reist, the Mooney, and the Heslep are all in the companion talcose vein, and have paid for a longer time than any other of their class in the State. The quartz veins in the granite about Soulsbyville are the most productive of their class in the State, and the cluster of pocket mines on Bald mountain is unsurpassed in the multitude and richness of pockets within a small area.

The Golden Rule, 1,600 feet long, is on the mother lode, about three miles eastward from Jamestown. The claim includes both veins, the main mother lode and the talcose slate branch or companion vein. At the surface they are 75 feet apart, and 87 feet below they are 40 feet apart. The main lode is 12 feet thick, exclusive of a horse, and the slate vein is eight feet. The latter is the one which is being worked. The vein is a black slate, bearing much resemblance to ordinary roofing slate, and is penetrated in every direction by seams of quartz, seldom more than two inches in thickness. The gold is found in the slate, seldom in the quartz. All the vein-stone is worked, though that near the foot wall is the richest. The rock is soft, and is easily extracted and crushed. The pulp from the battery is black like the slate. The walls are a hard magnesian rock. There is a slight dip to the east. The mill has 15 stamps and is driven by water. The weight of the stamps is 750 pounds, their speed 50 blows per minute, and their drop from five to eight inches. There is sufficient power to drive 15 stamps more. The water is obtained from the Columbia Ditch company. About 85 per cent. of the gold is caught in the mortar, and nearly five per cent. on the copper plates immediately below. The pulp runs over a shaking table, which has 120 jerks per minute, and is cleaned out twice in 24 hours, yielding about 400 pounds of sulphurets each time. The pulp also passes over blankets, which are washed once in an hour. There are 10 pounds of pure sulphurets to a ton, but the concentrated tailings as saved are about 40 pounds to a ton of ore, and there are $40 per ton in these tailings, which are worked in an arrastra, which pays six ounces a month. A Stetson amalgamator below the blanket pays only $1 per month.

The slate vein was brown and decomposed at the surface, and was washed in sluices by placer miners to a depth of 30 feet. In 1866 the present mill was finished, and in the year preceding the 1st of July, 1867, the number of tons crushed was 4,099; the average yield per ton, $8 94; the total yield, $36,653; cost of labor, $16,500; cost of repairs, timber, lumber, charcoal, hauling, taxes, &c., $5,800; cost of supplies sent from San Francisco, including salaries of president and secretary, freight in bullion, travelling expenses, &c., $1,500; dividends, $7,500, and cash on hand, $2,953. The total expenses were $6 39, and the net profit $2 55 per ton. The average number of days that the mill ran in a month was 23; the highest being 27 and the lowest 17. The average yield per ton was $5 71 in March, $6 79 in January, $6 97 in June, $7 72 in November, $15 54 in October, and $10 or $11 and odd cents in the other months. The number of men employed was 16, of whom 8 were miners, 2 carmen, 4 millmen, a blacksmith and a superintendent.

The rock is extracted through a tunnel 400 feet long, 80 feet below the summit of the hill, and 500 feet above the level of Sullivan's creek, below which the mine cannot be drained by a tunnel.

THE MORGAN MINES IN CALAVERAS COUNTY.

MORGAN.—The Morgan mine, 500 feet long, on the mother lode, was discovered in 1850 by a man named Hance, who took in six partners, Morgan being the president. The discovery was made on the summit of Carson Hill, and the rock was extremely rich; indeed, if the statements of those who lived at the place are to be taken, the gold was abundant beyond any parallel. Much of it was taken out in mortars, and not unfrequently there were so many strings of gold in the rock that cold-chisels had to be used to cut them. On one occasion gold to the amount of $110,000 was thrown down at one blast. The news filled the State with excitement. The town of Melones, on the southern side of the hill, became the largest mining camp in the State, with a population variously estimated from 3,000 to 5,000. People came in crowds to see the mine. Robinson's Ferry, on the Stanislaus river, two miles south of the place, took in $10,000 for ferriage in six weeks. From February, 1850, till December, 1851, the production continued uninterrupted and with very little decline. In that time, according to Thomas Deare, who has lived at the mine longer than any other person, $2,800,000 were extracted and immense sums stolen. It is reported of one Mexican miner that he stole $1,500 in one day from the arrastra which he had in charge, and paid it the next day for a horse. All the rock too poor for the hand mortar was ground in arrastras, and it is said that 50 of them were running at one time. The facilities for stealing were great and the temptation strong. Gambling was carried to a great extent and gold seemed to have lost its value. The miners were mostly Mexicans, who, as a class, were not looked upon with much favor by American miners; but they had had experience in this kind of mining, and their services were indispensable. They could pick up the lumps of gold in the mine, or they could take handfuls of amalgam from the arrastra with little fear of detection. As for the amount taken in this way, it could never be ascertained, but that it was great was assumed in the common conversation of the miners themselves.

The vast production was too great to be witnessed in peace. Several hundred ruffians banded themselves together, under the lead of Billy Mulligan and others of his kind, and drove away the owners of the mine by force and worked it themselves. A suit to eject them was commenced, and after nine months their work was stopped by injunction, and in the spring of 1853 final judgment was rendered in favor of Morgan and his associates. Morgan then went to England to sell the mine, but more litigation sprang up about the title, and there was no final decision and very little work till the spring of 1867, the mine having lain idle for nearly 15 years. The work has lately been recommenced, and report says some marvellously rich rock has been taken out, but the superintendent did not feel himself authorized to give the precise facts for publication.

The mine is near the summit of the hill and includes two veins, which unite 100 feet below the surface. One is about six feet wide and called the stratified vein, because of numerous seams parallel with the walls; the other is 40 feet wide and is called he boulder vein, because the quartz in it is solid and boulder-like. A tunnel 160 feet long strikes the vein 100 feet below the outcroppings, and from this drifts have been run 200 feet on the vein, finding pay rock all the way. The richest rock is a talcose slate on the foot-wall. The mine can be worked conveniently by tunnels to a depth of 500 or 600 feet. There is no mill now, but the proprietors propose to erect one, and they are now taking out rock. In the middle of June they had 5,000 tons already out.

THOSS' SULPHURET WORKS IN AMADOR COUNTY.

The sulphuret mill of W. H. Thoss, near Pine Grove, is the only establishment of the kind in the State, and he is the only man who has any repute for possessing exclusively any valuable metallurgical secrets. He pays high prices for sulphurets, and works them without wasting, and in a few instances he has worked sulphurets at a fixed price per ton or on shares. Those for whom he has worked speak well of the result obtained, and the general impression in the neighborhood is favorable to his claims. He says that his process is valuable only where there are sulphurets; that he can extract 90 per cent. of both gold and silver at a total expense of $6 per ton; and that he would rather have new than old sulphurets. In the chlorination works roasting is necessary and the silver is lost. Among those who speak well of Mr. Thoss are the proprietors of the Sirocco mine, who paid him $80 per ton for working sulphurets, and returned them $220 per ton. The mill consists of a crocodile crusher, which reduces the rock to the size of peas, and of two cast-iron pans 10 feet in diameter, cast in sections and enclosed in wood. These pans have each four heavy greenstone mullers which make 25 revolutions per minute. The pans take charges of 750 pounds of crushed quartz or sulphurets and reduce them to impalpable powder in five or six hours. From the pans the pulp runs into a lower chamber into which nobody but the proprietor enters, and there his secret process of amalgamation is accomplished. He says that he makes from $10 to $600 per ton from the material which he purchases, and that the supply of sulphurets offered to him for sale is five-fold more than he can work. He does not enlarge his establishment, because it would be necessary to communicate his secret to others, and he is unwilling to do that.

A GREAT WAGON ROAD.

The Placerville road is the best wagon road across the Sierra Nevada. It cost $585,000, and as now travelled from Shingle Springs to Van Syckles, in Carson valley, is 82 miles long. The steepest grade is six degrees. The total length of the stretches that exceed five degrees is a mile and a half; there are five miles of five degrees, 10 miles of four degrees, and most of the road is under two degrees, with a very regular and easy ascent. In 1858 Sacramento and El Dorado each subscribed $25,000 to construct a wagon road across the mountain; but the road was not good enough for the purpose, and in 1860 the present road was commenced by private enterprise, and was finished in 1863. It was of vast service to the State and to Washoe during the silver excitement, and was for a time very profitable to the owners. Although other routes have lower passes and easier grades, no other can compete with this for the ordinary purposes of wagon travel, because this is on the shortest route between Sacramento and Virginia City, is an excellent road, and is kept in fine condition. In 1863 the total amount of tolls taken on the road was $190,000, and the expenses were $70.000; in 1866 the receipts were $65,000, and the expenses $50,000. The road is watered every evening along its whole length by water carts, which are stationed at intervals of three miles. This is found to be the cheapest method of keeping the road in good condition, for if it were left dry it would have deep dust, which would obstruct the wheels and blow away, leaving deep ruts. About one-fourth of the expense in keeping the road in order is required to keep the snow down. Last winter snow lay for nine miles on the road, and ten span of horses were kept for the special purpose of breaking it down. There was a station in the middle of the snow belt, and whenever it began to snow a man started with a team and a sled in each direction to the end of the snow belt and then drove back; then took another team, and the horses were kept going as fast as they could. In this way the snow was packed down and the road was made hard and fit for travel. It would be useless to shovel the snow from the road, which would immediately drift full. The toll for a four-horse wagon from Shingle Springs to Van Syckles and back is $17.50, three-fourths being for the eastern trip. Most of the freight, however, has been carried in wagons drawn by more than four horses. The best teams have ten mules and two wagons, the second wagon being smaller and fastened immediately to the first. An ordinary load for such a team is 20,000 pounds. The advantages of having two wagons instead of one are that one wagon, unless made in a most unwieldy manner, would not be strong enough to support the weight; that the two wagons do not cut up the road; that if there is a mud-hole, only a small part of the weight is in it at a time; that at any steep pitch in the road the wagons can be separated, and each hauled up separately; and that one teamster can as easily take care of two wagons as of one. The cost of the first wagon is about $600; of the second, $300; an

of good mules, $300; making $3,900 as total cost, exclusive of harness. The tolls on a round trip from Shingle Springs to Van Sycles are $26.25; and the total necessary outlay on a trip, $240. This is the most extensive toll road in the United States.

THE MARBLE QUARRIES OF EL DORADO COUNTY.

A considerable part of the marble used for tombstones in California is obtained from a marble quarry at Indian Diggings. Stealite, or soapstone, of very good quality is obtained from a quarry near Placerville, and numerous places in the county supply a chalk-like silicate of lime that is used in San Francisco for polishing metals, especially silver-ware. The county has 85,000 acres of enclosed land, 22,000 acres under cultivation, 1,164,000 grape-vines, 91,000 apple trees, 52,000 peach trees, saws 10,000,000 feet of lumber annually, has taxable property assessed at $3,500,000, and casts 5,000 votes. Agriculture has made more progress in this than in any other mountain county, perhaps because of its proximity to Nevada, which it supplies with fresh and canned fruit, with wine, and with many kinds of vegetables. The possession of the Placerville road across the mountains has done much to bring business to the county. The Alabaster cave in the northwestern corner, and Lake Tahoe at the northeastern, are both places of fashionable resort.

CEMENT CHANNELS.

There are several old channels in El Dorado county, and they appear to belong to two different systems of drainage and periods of existence. They may be distinguished as the blue and the grey, according to the color of the cement or gravel found in their beds. The blue is prior in time, and only one blue channel has been distinctly traced in the county. It runs from the northwest to the southeast, nearly with the course of the slates, and has been found at White Rock, Smith's Flat, and Tryagain tunnel. The channel is 220 feet wide, and 250 feet above the level of Weaver creek. The rim rock is never less than eight feet higher than the bottom of the channel. The cement is harder and more brittle, and contains more quartz, and quartz of a bluer color, and pebbles smaller and more uniform in size than the grey cement. This channel, with its well-defined banks and a deep covering of lava, formed a bed in which ran a subterranean stream of water that broke out in springs on the hill-side, where the channel was cut through by Weber creek, and the quantity of water was sufficient to supply Placerville when it had 4,000 inhabitants. A tunnel company working in the basin of Hangtown creek cut a tunnel across this old channel, and the stream of water which had previously run down to Weber creek then ran out through this tunnel into Hangtown creek. The tunnel company sold the water to the Placerville Water company, but the South Fork Canal company, which had previously appropriated the water of Hangtown creek, brought suit for the water on the ground that Hangtown creek was the natural outlet for this water, and that they owned it by prior right. Professor Silliman was called as a witness by the defendants, and after examination he testified that the waters never had run into Hangtown creek, but that until the tunnel was cut their only escape was at the springs on the back of Weber creek. The plaintiffs, after seeing the testimony, discontinued the suit. This is the only case known to us of a legal investigation into the character of an ancient auriferous channel in California.

The New Jersey claim is 650 feet front by 4,000 feet deep, under the lower part of the town of Forest Hill. Work was commenced in August, 1853, on the tunnel, and six years and a half of hard work passed with an expenditure of $60,000 before any return was obtained. When the tunnel was in 1,800 feet, an incline was run upwards to the red gravel, which was found to be rich, and the $850,000 were taken from an area of 500 feet long by 400 feet wide. The extraction of gravel was continued till April, 1867, when drifts were commenced to open new ground. The tunnel was started in 1853, with the confident expectation of reaching pay in a year; but as the work advanced more slowly and cost far more, the company had to run in debt, and when they reached the pay their debts amounted to $30,000 or more, and some of them had been outstanding for more than four years. The creditors numbered eight or ten, mostly merchants, who knew nothing of the New Jersey company, save that they appeared to be hard-working, sober, honest men, and were trying to develop a claim supposed to be valuable. There was no long personal acquaintance and no security. The debts bore three per cent. interest per month. The most dangerous period for the company was after they began to wash. A dishonest creditor might then, perhaps, have taken the claim, or at least have caused much expense by an attachment suit; so the fact of the finding of good pay was kept as secret as possible until the $30,000 had been taken out, and then all were paid off at once. This system of giving credits was general in the mines fifteen years ago, when the profits charged were very high, when large interest was allowed, when many extensive enterprises were undertaken, and when a large number of these enterprises met with magnificent success, of which the New Jersey claim is a bright example.

Seven channels have been found in this claim, running with the slates about northwest and southeast, all parallel to one another, about twenty-five feet apart, sixty feet wide, with ridges of rock seven feet high between them. The dip from each side of the divide seems to be towards the middle of the hill. There is no water for washing from the middle of July till the middle of November, and meantime the dirt extracted is thrown into a pit large enough to hold 8,000 tons, where water is thrown on it occasionally so as to soften the cement, and also to attach the mass together and prevent it from sliding down hill when the rains come. In busy times the New Jersey company employs sixty or seventy men, the annual expenses are $60,000 or $70,000, and the profit one-half the yield.

The dirt is hauled out in cars four feet and nine inches long, twenty-eight inches wide, and fifteen inches deep. The weight of an ordinary car-load is 1,600 pounds. A steady stream of water runs out from the tunnel and is caught in wooden reservoirs, twenty feet square and eight deep, to be used for washing. The sluice is half a mile long, and the grade is in one part eighteen inches, and in another twenty-three inches to twelve feet. The steepness of the cañon renders it necessary to have a steep sluice. Slat riffles, made of five strips of board an inch thick, two inches wide and six feet long, with strips of the same thickness set between at the ends, and the middle bolted through, are used. The top of each strip is shod with a strip of iron an inch and a half wide and a quarter of an inch thick, screwed on and countersunk.

HYDRAULIC MINING IN NEVADA COUNTY.

The hydraulic system came into use in Nevada county in 1853, and enabled miners to work with profit a vast amount of auriferous ground that would never have paid by the old process of sluicing. About April, 1852, A. Chabot, mining near Nevada City, used a hose of some thirty-five or forty feet in length, through which the water was conducted from the top of the bank to the bottom of his diggings. There was no pipe or nozzle at the end, but still it was found to be a great saving in sluicing off the earth and gravel that had been picked down, and also a convenience in cleaning up the bed-rock. So far as known, the hose was not used that season in any other claims, and it does not appear that Chabot discovered the great advantage that would result by directing the stream of water against the bank. This discovery was made by E. E. Matterson a year later. In April, 1853, Matterson and his partners, who were working a claim on American Hill, rigged up a hose, attached a nozzle at the end, and directing it against a bank as water is thrown upon a building by a fire engine, found that a small stream of water would do the work of a hundred men in excavating earth. Very soon after this the hydraulic was adopted by the miners throughout the county wherever water and a sufficient fall could be procured. Successive improvements have been made in hydraulic mining, until the appliances now in use but little resemble those of 1853, but the principle is the same, and to Masterson is due the credit of the important discovery.

The water is usually conducted into the diggings through large iron pipes, at the end of which the hose is attached, and the water having a high fall, is compressed and forced through an aperture of one and a half to two inches in diameter. The pipes are made of heavy sheet iron, and the hose of stout canvas usually double thickness. Where the pressure is great, the hose are still further strengthened by a net-work of strong cord. In some of the larger mining operations five or six streams of water are kept playing upon the bank, undermining the ground and melting away the hills at an incredible rate. In this manner acres of ground, frequently 100 to 200 feet deep, are washed away in a single season, and the bed-rock left bare. The water shoots from the nozzle with tremendous force, and miners frequently direct the stream against huge boulders to roll them out of their way. The hydraulic is the most effective method ever yet devised for excavating large quantities of earth, and the process was employed to some extent in 1866, by the Central Pacific Railroad company, in cutting through the deep hills near Dutch Flat.

The American miners, except those engaged in quartz, are chiefly working the deep hill diggings by the hydraulic, the shallow flats and ravines, as a general thing, being abandoned by the Chinese. In most cases, the cost of opening the deep claims is heavy, requiring considerable capital and the nerve to invest it, or the aggregated labor of a number of miners who are content to work, perhaps for years, in the hope of an eventual reward. In too many cases their labor and perseverance has come to naught. The richest deposits are found on the bed-rock, in basins or channels of ancient streams, and to reach these, tunnels have to be run in solid rock, varying in length from a few hundred to several thousand feet, in order to drain the ground and get an outlet for sluicing. Wherever practicable, a shaft is first sunk to prospect the ground and ascertain the position of the basin or channel, so that the tunnel, in coming in, shall be below the auriferous deposit. But this cannot always be done, and expensive tunnels are sometimes found to be too high to work the ground, and a lower one must be run or the claim abandoned. The tunnel serves the double purpose of draining the ground and a sluiceway, and the mining usually commences from a shaft sunk from the surface to the head of the tunnel.

The most important centre of hydraulic mining in this county is at north San Juan, in Bridgeport township, and a brief statement of the operations of some of the companies there will give an idea of the scale on which this branch of mining is conducted. The Eureka company, whose claims were on San Juan Hill, commenced a tunnel in August, 1855, to reach the inner basin. The tunnel was completed in October, 1860, at a cost of $84,000, in actual assessments, and the cost incurred before a dividend was declared was $142,000. During the existence of the company the average number of men employed daily was 25, and the total yield of the claims, $430,000. The claims known as the Deadman Cut, which were worked out in 1859, yielded $156,307, at a cost of $71,433. The claims of McKeeley & Company, on Manzanita Hill, were worked from 1855 to 1864, yielding $368,932, and paying its owners in dividends $126,660. The claims above mentioned have been worked out, but there are other companies still carrying on extensive operations in the vicinity, some of which are deriving a handsome revenue from the profits of working their claims. The tunnel of the American company is 1,800 feet in length, having been run much of the distance through blasting rock. This company has adopted all the improvements in hydraulic mining. They have a mill with eight stamps for crushing cement, and their sluice boxes extend from Manzanita Hill to the Middle Yuba, a distance of nearly a mile, where they have pans for grinding the sand. The company usually employ 25 men, use 500 inches of water, and the claims yield from $10,000 to $15,000 a month. It will require three or four years longer to work out the claims. The tunnel of the Yuba company is $1,500 feet in length, and was completed last spring after eleven years' labor. This company uses 400 inches of water, and has ground enough to last ten years. The tunnel of the Star company is 1,400 feet in length, that of the Golden Gate company 800 feet, the Wyoming company 1,000 feet, the Knickerbocker company 2,000 feet, the Badger 700 feet, and that of the Gold Bluff company 1,800 feet. These tunnels have been run for much of the distance through solid rock, which costs from $30 to $50 a foot.

CEMENT MINING.—In some of the auriferous deposits found in the beds of the ancient lake and watercourses the gravel is cemented together so compactly that considerable force is required to pulverize it in order to save the gold by the sluicing process. For this purpose various expedients have been devised by the miners, among which is the erection of stamp mills, similar to those used in crushing quartz, and the business has become of considerable importance in this county. Little Rock township has taken the lead in this branch of mining. Cement mills have also been erected in Washington, Eureka, Bridgeport, Nevada and Grass Valley townships, but mostly as adjuncts to hydraulic mining, and the yield from this source, as compared with that from other branches of mining, is small. In the Little Rock, however, it is the leading business.

EXTENT OF THE PLACER MINES OF NEVADA COUNTY.

The product of the placer mines of Nevada county has neither materially increased nor diminished since 1850, and though they have been worked without interruption for 19 years, the developments of that period have barely been sufficient to give us an idea of their vast extent. The shallow diggings, which were so easily worked, and afforded such large returns to the early miners, are mostly exhausted; but the deep placers, or hill diggings, in the channels of ancient streams, in many places underlying hundreds of feet of alluvial deposits and volcanic material, cannot be exhausted for a long period of time. In fact, for all practical purposes, they may be considered as inexhaustible.

AN IMMENSELY VALUABLE MINE.

The Eureka mine, now regarded as the most valuable gold mine in Nevada county, and perhaps in the most valuable in the world, is situated a mile and a quarter northeast of the town of Grass Valley, and was located early in 1851. It was worked at intervals, by various parties, up to 1857, but the most of the rock failed to pay for crushing. In the latter year it was purchased by Messrs. Fricot, Ripert, and Pralus, and the first crushing made by them; the rock, being taken from near the surface, yielded only $4 a ton. From 1857 to 1863, the mine was worked to a perpendicular depth of 50 feet, during which a large quantity of quartz was taken out, none of which paid largely, and the greater portion failed to pay expenses. Becoming satisfied, at length, that the mine was a good one, they sank a verticel shaft, in 1863, to the depth of 100 feet, and the mine has since been yielding handsome returns. On the 1st of October, 1865, the mine was sold to a company of capitalists for $400,000 in gold coin. How much it had yielded up to that time is not known, but the owners erected hoisting works and a 20-stamp mill, all at a cost of $60,000, besides receiving large dividends from the profits. The mine has been producing, under the present management, at the rate of about $40,000 a month. The first year, ending September 30, 1866, the gross product was $531,431, and for the eleven months ending August 31, 1867, $588,139, making a total of $1,119,570 in 23 months. Nearly a thousand tons of rock have been taken from the mine every month and reduced at the mill, the average yield being not far from $50 a ton; and the monthly expenses, including repairs to machinery and permanent improvements, have averaged about $16,000. The regular monthly dividends for over a year past have amounted to over $30,000, and one or two extra dividends have been declared in addition. The Eureka mine is opened by an incline shaft, 5 by 20 feet, which is designed to explore the vein to a great depth, and is now down nearly 500 feet. Levels have been run from the shaft at distances of 100 feet apart, and for 700 feet along the lode. At 50 feet from the surface the quartz paid $15 a ton, and increased to $28 at 100 feet. Between the 100 and 200-feet levels the average yield was $37 a ton, and below that the average has been $50. The vein runs nearly east and west, dipping south at an angle of about 78°; and over the whole extent of some 700 feet which has been worked, the average width is three feet. At the fourth level the mine is said to show still further improvement, with an increase in the yield of ore, though it has been worked but little below the third level. The value of the mine, with the mill, hoisting works, and other property connected therewith, is now rated at about $1,000,000. William Watt, a successful quartz miner, and one of the owners of the Eureka, is the superintendent.

THE USE OF POWDER.

In the Smartsville Blue Gravel claim, at Sucker Flat, in Yuba county, powder is used more extensively than in any other hydraulic claim, indeed, probably more than in any other mine in California. All the strata are too hard to be piped down with economy, and some of them are so hard in places that the pipe would scarcely affect them. So much powder has been used here that its employment is reduced to a system. The quantity of powder for the blast depends upon the depth of the bank and the surface area to be loosened. If the bank is 50 feet deep a tunnel four and a half feet high and two and a half wide may be run in 75 feet; a cross-drift 60 feet long is cut across the end at right angles, and another similar cross-drift of equal length 55 feet from the mouth of the tunnel. 300 kegs may be used in such a blast, all distributed along in the cross-drifts and in the tunnel beyond the first cross-drift. 20 kegs near the intersection are opened by taking out the heads; the others are left closed, with the certainty that they will all be opened by the explosion of the 20. From the intersection to within 10 feet of the mouth wooden troughs two inches wide and deep inside are laid, and a liberal supply of powder is poured in, leading to an open keg. The 10 feet next the mouth are laid carefully with a fuse, and for that distance the tunnel is filled in with dirt. When the blast is fired a dull, heavy sound is heard, the earth rises slowly about 10 feet; it then settles down, leaving a dust behind it, and on examination an area about 120 feet square will be found all shattered.

By blasting, the water is enabled to carry off twice as much dirt as it would otherwise; and as 500 inches of water are used at an expense of $75 per day, there is a vast saving. The cost of powder is large, as about 10,000 pounds are consumed monthly on an average in this one claim. After the ground has been blown the pipes can bring down more than they can carry away, so about one-third of the water is allowed to run down over the bank, while the remainder is thrown through the pipes.

GOLD AND SILVER.

Nevada.

[From our Regular Correspondent.]

NEWARK, NEVADA, May 18, 1868.

A PROSPECTING TRIP

through the mountainous and comparatively unexplored portions of southeastern Nevada is always a pleasure to the genuine prospector. The hope of finding something good in the way of mines is naturally exciting, but in the mere exploration of the country, with the view of ascertaining its grazing and agricultural capabilities, there is also considerable enjoyment to the mountaineer. It is not all pleasant, however, for even in the summer months the alternations in the weather are frequently so sudden and extreme, that one's constitution must be sound, indeed, to stand it any considerable time.

It may interest your readers to know what kind of outfit a Nevada prospector considers it necessary to have, before he feels justified in starting out from the present small centres of civilization into the desert wilds. He needs first of all a good mustang, which will be equal to a journey of sixty miles a day with two hundred pounds on his back. The small, wiry Spanish horse is a marvel of endurance, seventy-five miles a day being nothing unusual for him; his feed is not the barley which the Arab is supposed to require to give him endurance, but the mountain bunch grass is to the mustang both grain and hay. The prospector requires, in addition to his riding-horse, which costs him from $60 to $80 in gold, a good, stout pack-animal, to carry his blankets and cooking utensils. His supplies of provisions consist of flour, bacon, beans, and a few of the common luxuries and condiments of the table, though the latter article of household furniture is no part of his equipment. Two or three prospectors usually go together, and take chances in company. When seated around a log-fire, built in some sheltered ravine, (or cañon, so termed here,) they are as jovial fellows as could well be desired. Their scrambles over the hills during the long day may have made them tired and ready for sleep, but there are always agreeable stories to hear and tell, which, for the time being, banish sleep from the thoughts. In a few of the outlying portions of the State, towards its eastern boundary, there is occasionally some risk of a camp being suprised by Indians, but in this respect Nevada is singularly well situated. The Shoshones are generally friendly to the whites, and some of them, for the paltry consideration of a horse or blanket, have made very important mining discoveries for the benefit of American miners.

NEWARK DISTRICT.

I left Austin on the 13th to spend a few weeks in the White River Mountain range, and am now on my way thither. Having been here for a few days, I have had an opportunity of examining the mining property of

THE CENTENARY COMPANY,

a New York incorporation, which has been operating here for eighteen months. The mining district of Newark is about ninety miles east of Austin, on the eastern base of the Diamond range of mountains. It was discovered in October, 1866, an Indian having taken a white man to the canyon in which the principal mines are located. So far the discoveries have been confined to two mountains, which present a rugged, precipitous face towards the valley lying to the east of the range. On approaching from the southeast, the formation of these mountains presents a singular appearance. Layers of dark-colored rock, apparently several feet in thickness, lying nearly horizontal, though with a slight dip to the north, are seen piled one on another for a thousand feet from the mountain base, giving the rugged surface a steep, stair-like appearance.

On the crest of the jagged face there is a stretch of table land running off for quite a distance towards the highest peaks of the range. A deep rugged canyon divides the two mountains alluded to, and it is about half a mile up from its mouth where the min-

ing operations of the Centenary company are being carried on. The lode on which the principal work has been done is the Chihuahua, having a course nearly northwest and southeast, with a pitch to the southwest of about 75 degrees. It is evidently a strong vein, bodies of ore and vein-matter being sometimes found over twenty feet in width, and it appears to cut the formation with its horizontal layers, as could only be seen in the case of a true fissure vein. At some points the walls are regular, smooth, and solid, though at others they are not visible, the quartz being thrown out of its place by masses of rock, which also at other points seem to pinch down the ore to a mere thread. The formation is usually called a limestone, and it probably contains considerable calcareous matter, but not enough to admit of lime being obtained from it by burning. It is a blackish grey silicious rock, almost of the nature of marble, with small thread-like veins of feldspar passing through it. It has a crystalline fracture, but the crystalization appears to have been in a great measure destroyed by pressure. At the head of the canyon the mines are in, some very perfect fossils have been found. They are precisely similar to certain fossils found by Professor Gabb and myself last summer in Hot Creek district, though no trilobites have yet been discovered. The formation, too, is the same, and that was pronounced by Mr. Gabb to belong to the lower Silurian. There is no doubt in my mind that the districts of that creek, Newark and Reveille, are identical in the geological scale, the only difference being in the inclination of the layers of rock, due, no doubt, to local and ancient causes. The mines owned by the Centenary company consist of the Chihuahua, Lincoln, Washington, Buckeye, and Indian Jim.

The Chihuahua has been opened by a tunnel running northerly along the vein, 250 feet from the vein; a prospect shaft 80 feet deep has been sunk in the latter, and a level run underneath, parallel with the tunnel for 200 feet, but owing to the bursting in of snow water flowing down the canyon in the winter months, the lower works cannot now be entered. This necessarily interferes with the present extraction of ore, a space of 250 by 80 feet nearly surrounded by levels and wings, and supposed to contain considerable deposits of ore, not being accessible till the dry summer weather puts an end to the stream of water. From the upper works, and from various points along the outcrop of the vein, south as well as north of the canyon, several hundred tons of fine milling ore, carefully assorted, have been extracted. About forty men are employed in the mines, and though the works are not yet opened so as to admit of a full supply of ore for the fine twenty-stamp mill being obtained at present, there is no doubt that with a mine of such promise as the Chihuahua there will ultimately be no lack of the needful material to keep the stamps going steadily. The Centenary company, like other eastern mining incorporations, fell into the mistake of supposing that all that was necessary, after buying a promising series of mines, was to build a costly mill, and depend on the mines yielding the necessary ore to run it. Even the most valuable silver-bearing lode in the country is not capable of doing such a thing. A mine needs to be well opened before it can be depended on to yield 14 to 13 tons of milling ore per 24 hours, and where, as in the Chihuahua, the quartz is so hard as to make it slow blasting from the surface, it takes years to open the mine for extensive extraction. Recently a main shaft of two compartments has been started, which it is estimated will strike the lode some five hundred feet from the bed of the ravine. When this has been opened and the requisite levels have been run, there is every reason to expect an abundance of ore. As yet the mine has not been opened to the water line, and experience has proved that where such bodies of valuable ore as have been found in dry rock in the Chihuahua exist, the quantity is increased and reliable when the natural water rock has been penetrated. From the ore which has already been worked in the mill, it is known to be of the grade of $100 per ton when even not very carefully assorted. The ore now ready for reduction is at least good for a pulp assay considerably higher than this.

THE CENTENARY MILL

is enclosed by a large lumber structure in the form of a cross. The main portion of the building contains the ore-house, with a Gardener's crusher, for cracking the quartz fine enough to go into the stamps; the battery floor, with four five-stamp double-ram batteries, and the amalgamating room. It is 140 by 60 feet, and is considerably larger, particularly in the pan room, than was at all required. The pans, ten in number, are said to be of a new pattern, something on the principle of the Varney pan, though not of equal merit; there are five seven-foot settlers, and one tailing pan. To the right of the battery floor, looking towards the amalgamating room, the building over the furnaces projects. It is 132 feet in length, by 42 in width, and contains eight reverberatory furnaces; the pulp to be roasted requiring to be hauled up by a windlass from the front of the batteries to the level of the furnace tops, along which a car-way is laid. The intention is to put up elevators to raise the dust to a bin on a level with the present car track. A superior engine of eighty-horse power propels the entire machinery of the mill, and is more than sufficient for the work required of it. The mill is built less than a mile from the mine, and being at the edge of the valley, is easily accessible from the ordinary travelled routes. It is abundantly supplied with water from a ravine a short distance to the northwest. Firewood is delivered at the mill at $6 per cord or less than half the price that similar wood commands in Austin.

CLOSING REMARKS.

On the whole, the property of the Centenary company is about as valuable as I expected to find it. Even at the high rates which require to be paid now for miners' and mining supplies, the mines ought to be worked at considerable profit. Much, however, will depend on future management. I am informed that a new agent is to take the place of the present reliable manager on the first of July, and that his sole recommendation for the office, is that he was once a lawyer in Boston, of no great success even in his own profession. In this country, such a thing as a lawyer making a good mining agent has never been heard of before, but there is no general rule destitute of an exception. With judicious management on the part of the new agent, the Centenary may be made a dividend-paying company; while, on the other hand, want of judgment and practical ability on his part will involve it in disappointment and little less than absolute failure.

E. J. DARE.

Idaho.

A correspondent of the Portland (Oregon) *Oregonian* writes from Lewiston, I. T., April 1, an interesting account of affairs in what is known as "Warren's Diggings," and of the country around about northern Idaho. It may be stated that the writer passed the winter among the snow-mantled hills of that locality. He says:

WASHINGTON CITY,

though not so large as the illustrious city from which it derives its proud name, nevertheless has a claim upon the public attention, being the point from which the denizens of that camp draw their supplies, and where they congregate betimes for business and pleasure generally. At present the population of Washington may not exceed fifty, but it is probably destined to rival some of the large mining cities of the coast. Heretofore, during the summer season, the town has been quite lively, and from three to five hundred miners have summered in the camp; but it is anticipated that the coming spring and summer will witness a great rush of adventurers and a prosperity never before known. Washington is located near the base of a monntain, and close by a stream called Meadow Creek. About half a mile above is the site of the once-projected city of Richmond, which in 1862 boasted of several houses; at present but one badly dilapidated building remains as a monument of former greatness.

HIC JACET MILL.

The erection of this mill in the dead of winter (everything considered) was a gigantic undertaking, but in the end has been successful. W. H. Farrar, in charge of the reduction works of the Pioneer Mill, after the failure of the company's engineer, took charge of the machinery, rebuilt the battery, and the mill is now in good running order and doing well. They have crushed in all 112 tons of ore—the last twelve tons being unassorted ore from the Scott ledge, and yielding $86 per ton. By this time they have probably crushed several tons from the W. B. Knott, and the yield, which promisad to be large, will be known here in a few days. This mill is propelled by steam, and is located favorably among the gold-bearing ledges of the camp, the nearest lead being the Hic Jacet.

PIONEER MILL.

This mill, the first one built in Warren's, owned by Messrs. Williams & Maxwell, is run by water power, and can be operated all the year round. Capt. Williams, the original designer and workman of this mill, has proven his competency as a complete and thorough engineer and mechanic. The Pioneer mill was put up as a mere test of quartz, and the company now being fully satisfied with the result, intend putting in ten five-hundred pound stamps early in the spring, in addition to what they now have, together with pans and concentrators. The present battery is a five-stamp one, manufactured in San Francisco. This company is now prepared for the reduction of silver ores, having just finished a large reverbratory furnace, together with the barrels, amalgamators, pans and concentrators. During the coldest part of the winter a ditch was brought from Warren's creek, one and a half mile distant from the mill, thus securing a never-failing supply of water. The Pioneer mill recommenced operations on the 20th ult., having on hand about fifty tons of float rock from the Washington ledges.

LEDGES.

At present the Winfield Scott is the favorite ledge of the camp, having yielded nearly $200 per ton free gold, as worked by the Pioneer mill; it is also rich in sulphurets of silver. The Scott was discovered about a year ago by Wm. Taylor. It is about two feet wide in the discovery claim. Three companies are now engaged in taking out quartz from this lead. The W. B. Knott is convenieniently located to the Hic Jacet mill, and is about five feet wide, but not well defined. A thirty foot shaft has been sunk on this ledge, and about one hundred and fifty tons of ore taken out. Very nearly one hundred tons of rock have been taken out of the Hic Jacet ledge and worked, the yield of which has been satisfactory. Messrs. Hanna & Co. have extracted about seventy-five tons of rock from the Sampson ledge. They have recently had thirty-six tons of decomposed ore crushed, which was unassorted, and obtained about thirty dollars per ton. They are satisfied their rock will pay, and so have put on a day and night shift. This company has run a tunnel one hundred and fifty feet, and are sinking a shaft. The ledge is about twenty inches wide, well defined and rich in sulphurets of silver and free gold. A shaft is being sunk upon the Washington ledge by the Pioneer mill company. They have found the ledge three feet wide and well defined. Several new quartz ledges have recently been discovered and recorded, some of which are estimated to be very rich, and parties are continually out prospecting for more. Altogether about one hundred ledges have been discovered in Warren's camp.

CINNABAR.

I learn that rich specimens of cinnibar have recently been found in the sluice-boxes of Messrs. Pollock & Co. at Miller's camp, twenty miles from Washington, and that parties intend prospecting for it this spring.

FIRE CLAY,

of a good quality, suitable for furnace and building purposes, has been discovered in camp.

WARM SPRINGS.

This favorite resort is twenty miles this side of Washington. The water of these springs is said to be composed of sulphur, iron, soda, cream tartar, lime and alchohol. As to its medicinal qualities they are claimed to be wonderful; in that frail humanity may find a sovereign remedy and cure for all diseases of the flesh by merely bathing in its limpid waters. A fine swimming-pond is attached to the springs. In addition to the above, I am informed that soda and salt springs, both hot and cold, have been found in Warren's district; if so, they will be of great value in the future. The salt springs, especially, will be regarded in that camp as an invaluable discovery, owing to the immense cost of salt necessary in the reduction of ores.

PAYETH LAKES—FISHERY.

These lakes are about forty miles from Washington. One of them is about twelve miles long and contains great quantities of trout and other fish. The scenery surrounding the lakes is grand and game is abundant. The contemplated road from Boise to Washington (if built,) will pass here, and in the future this point may become one of much importance. Of the fish species, large numbers of what the Indians call red fish, are found. Messrs. Combs & Co. deserve great credit for the energy they have displayed in establishing a fishery. Last summer they sold two thousand dollars worth. These fish have never been found anywhere except in that district.

NEW PLACER MINES

were discovered last fall, on the east fork of the Salmon river, about fifty miles from Washington, by Messrs. Jules & Co. They are said to have prospected well. Several parties interested are going there this spring.

MISCELLANEOUS.

The country round Warren's is well watered and timbered. The winters in that section are generally long and severe. The past winter, however, has been the mildest ever known. The average depth of snow, during the winter, was about three feet, and the coldest weather, which only lasted two or three weeks, was about thirty-two degrees below zero. At present the only transportation for goods to Warren's is by pack trains; but citizens of that camp are talking of building a road from Lewiston via Slate creek. Other parties contemplate building one from Kooster, at the mouth of Powder river, via Payette. One enterprise worthy of notice is the new wire suspension brigde spanning Salmon river, forty-five miles this side of Washington. It is two hundred feet long, and was built last year by Messrs. Hunt & Woodward. It is a fine structure, and a source of curiosity to travelers, who do not expect such conveniences in that out of the way country. In anticipation of a rivalry and growing importance, the Hic Jacet mill and adjacent buildings have been christened Rushville. Of course its future growth and existence will depend upon the result of the quartz mania in Warren's diggings.

ROLAND.

Montana.

SILVER LODES AND SMELTING FURNACES—DRAWBACKS AND PROGRESS.

LOUISIANA, PIKE CO., MO., May 15, 1868.

EDITOR AMERICAN JOURNAL OF MINING:

I have read in your valuable JOURNAL OF MINING numerous articles on the richness of the silver bearing lodes of Montana. I have also read of the progress of their development, and of the succees of Mr. Esler at Argenia with his smelting furnaces. Undoubtedly it seems to many of your readers that since the lodes have been proved to yield rich ores in abundance that may be worked at a trifling expense, their owners would raise from $5,000 to $10,000 and apply it to the erection of works similar to Mr. Esler's, and proceed immediately to develop their mines and take out the silver. But, from personal knowledge, I am assured that the greatest part of the valuable silver property of Montana is not in the right hands for speedy development. It is held by the "poor prospector," who has not the means to enable him to make the developments necessary in order to effect a sale at a reasonable price, nor to erect mills or employ smelters to test and bring to light the value of his property. Another class of property holders are those who have purchased a few feet, at a very low rate, on a great many leads. This has divided the interests on many leads very much. The object of these small operators is to speculate or lay by until some one has developed or improved the lead on which he holds fifty or a hundred feet, that he may make his fortune at others' labor and expense. *It should be the law that if a majority of the property holders on any one lead agree to improve it, that all holding interests thereon should contribute to its development in proportion to his interest and distance from the claims so improved;* then there would be some encouragement for the working man or men to go to work and improve his or their claims. Notwithstanding the drawbacks I have mentioned, the example of Mr. Esler has instilled new life into all those having silver-lead property, and many a poor prospector will follow his example this coming summer. There are hundreds of chances as good as his, and many much better.

I have received a letter from S. P. Robinson, dated April 12th, from Bannock City. He says: "There has been but little improvement going on in the way of lead mining since you left until of late, and I look for considerable improvement this summer. I for one will not wait any longer for eastern capital or companies to buy me out or assist in developing my leads; neither will I now sell them at such insignificant prices to those who buy to speculate at others' expense. I have determined to try it on my own hook. Last month I commenced sinking down on the Silver Rose, situated two miles northeast of Bannock, in the Blue Wing district. I have got it down 32 feet, and have got as good looking a prospect as I have seen in the silver line since I have been in the country. This news will gladden many hearts, for there are no less than fifty claimants on this lead, it being discovered and recorded under the old law. But, nevertheless, four of us own 1,800 feet of it, which you know is sufficient for any one company. At this depth of 32 feet I have got a 10 foot vein of good paying mineral, if I may judge it from other leads that have been tried in this district, and also on Rattlesnake. I have tons upon tons of good mineral out, and a sufficient show at the bottom of the shaft to warrant a smelter, which I have already commenced in company with Derier and Fulls, which we will have in running order by the 1st of July. The lead on which I am at work is on the eastern slope of the mountain, and in a most admirable situation to tunnel, and strike it at a depth of 175 feet or more, with a tunnel not exceeding 225 feet, or with a longer tunnel it may be tapped at a much greater depth. At the foot of the mountain, about half a mile distant, there is a large spring of good water, and it is less than two miles down this ravine to Grasshopper creek, where there is plenty of water. Many old Nevada and Idaho miners who have examined the ore, and the size and extent of the lead, have pronounced it the mother lead of the district, and the ore of an excellent quality. The smelter which we are now building is also intended to accommodate all who wish to improve their leads and test the richness of their ores. Such a thing is needed here to help them get started. As soon as I get my present furnace completed, I shall build another for the Silver Rose alone."

COAL AND IRON.

New York.

The Boston *Railway Times*, June 6, says of the "strike" among the iron workers at Troy, N. Y., of which mention was made in last week's JOURNAL OF MINING:—"On Satdurday last work was suspended indefinitely in the Rensselaer Iron Works, the Albany Iron Works, and the Burden's Works, in the south part of Troy, N. Y., in consequence of demands made by the operatives for an increase of wages, and which does not meet with the sanction of the proprietors. The 'lock' is likely to remain for a long time. The workmen of the different trades have rather extravagant notions with regard to a reduction in the hours of labor and an increase of pay. Workmen who, in 1860, thought themselves well paid $1 50 or 1 75 per day of ten hours' work, now demand from $4 to $5 for eight hours' work. The matter will work its own cure in the end, but meanwhile a great many men will remain idle for indefinite periods of time, contracting habits of dissipation and thriftlessness that will seriously interfere with their future prosperity. We know of one large contractor who was forced to submit to the demands of his workmen to meet his contracts, but who now refuses to make further contracts, preferring to defer further business until the labor question settles down to something like permanence."

Pennsylvania.

According to the Pottsville *Journal* of the 6th inst., all the preliminary arrangements having been made, and the company having been organized, work has been commenced in Schuylkill Haven on the buildings required for the Griffith Direct Iron Producing Furnaces. It says:—"The site selected by the company is one of the most eligible, for a work of this kind, in the county, bounded as it is on the east by the Philadelphia and Reading railroad, and on the west by the Schuylkill canal. The necessary excavations for the foundations of the buildings are being made, and the stone masons are cutting and preparing stone. The castings are all made, the lumber ordered, and the work on the machinery, etc., is being pushed forward as rapidly as possible. We understand that this company starts out under very auspicious circumstances. Twenty-five per cent. of the capital subscribed has been paid in, and under the management of its able and energetic President, T. C. Zulick, Esq., there is every prospect of the early and satisfactory completion of the furnace. This project promises to result differently from the contemplated steel works at the same point a year since. It will probably be of interest to the reader to state, that, by the new and simple process, the invention of Mr. Griffith, which will be used at this furnace, rolled iron of any kind, rails, rods, bars, and sheets, are produced from the ore with only one heating. The apparatus consists essentially of a series of vertical retorts, with movable bottoms, communicating with a puddling chamber. The retorts are charged with the broken ore and charcoal, and the molten iron, after reduction, is drawn off into a puddling chamber, where the surplus carbon is burned out and the metal is piled into balls for the rollers. The fuel used in the operation is anthracite coal, through which a blast of steam is driven; the vapor of water is decomposed by the heat, the hydrogen, released, gives out an intense heat, and the liberated oxygen powerfully supports the combustion. The works at Schuylkill Haven, we learn, will be in operation within two months, and will be under the superintendence of Mr. Griffith, the patentee of the direction process. The Board of Management consists of T. C. Zulick, Jos. Patterson, Thos. Wren, Charles Wiltrout and Charles Meck."

MARKET REVIEW.

FRIDAY EVENING, June 12, 1868.

Gold and Silver Stocks.—The improvement and firmness noticed in Colorado stocks last week has, notwithstanding the depressing influence of storms and rains, continued through this week, and a marked advance is to be seen in our figures of to-day, compared with those of last week. In Nevada stocks, there is but little change to report, save in Twin river, which is offered at a lower figure. Prices were quoted to-day, as follows:

	Bid.	Asked.		Bid.	Asked.
Alameda Silver	40	— 55	Kipp & Buell Gold	— 5	— 15
American Flag	— 30	— 45	Keystone Silver	— 1	— 2
Atlantic and Pacific	— —	— 80	La Crosse Gold	— 40	42
Bates & Baxter Gold	— 21	— 50	Liberty Gold	— —	— 5
Benton Gold	— 25	— 32	Liebig	— —	— 4
Black Hawk G	6 00	7 00	Manhattan Silver	— —	150 00
Bobtail Gold	— —	1 50	Midas Silver	— —	— 25
Bullion Consolidated	— —	1 00	Montana Gold	— 36	— 44
Burroughs G	— 8	— 10	New York	— 65	67
Columbian G. & S.	— 4	— 16	New York & Eld'o	— —	1 75
Combination Silver	35 00	45 00	Nye Gold	— —	— 3
Consolidated Gregory	4 45	4 60	Oxyoke Mining	10 00	30 00
Coryaon Gold	— 32	— 36	Ophir Gold	— —	1 00
Edgehill Mining	4 55	4 65	People's G. & S. of Cal	— 5	— 15
Empire G	2 50	2 60	Quartz Hill	1 15	1 20
Gold Hill	— —	1 00	Reynolds Gold	— —	— 4
Grass Valley	— 10	— 25	Rocky Mountain Gold	— 16	— 20
Gunnell Gold	— 60	— 80	Smith& Parmelee Gold	3 25	3 40
Gunnell Union	— —	— 40	Sensenderfer	— —	10 00
H'n G & S. bs	— —	— 90	Symonds Fork Gold	— —	1 00
Harmon G. & S. bs	— —	3 00	Texas Gold	— —	— 12
Holman	— 4	— 10	Twin Riv Sil	— —	40 00
Hope Gold	— —	— 20	Vanderburg G	— —	— 75

Copper Stocks.—Davidson is a shade firmer, otherwise there is no change to note in the copper share market. Caledonia is now held at $5 00. Prices are quoted:

Caledonia C	— —	5 00	Gardiner Hill	— —	1 00
Canada	— —	— 50	Hancock C	— —	5 00
Charter Oak	— —	1 00	Hilton	— 50	1 00
Copper Falls	22 00	— —	Isle Royale	— —	4 00
Davidson	— 60	— 75	Knowlton	— —	2 00
Evergreen B	— —	10 00	Minnesota	— —	4 00
Franklin C	14 50	— —	Ogima	4 00	6 00
French Creek	— 10	— 15	Rockland	— —	4 00

Petroleum Stocks—Sales of Buchanan Farm were made to-day at 41c.; prices show a general advance, being thus quoted to-day:

	Bid.	Ask'd.		Bid.	Ask'd.
Bennehoff Run	....	1 30	N. Y. and Alleghany	....	2 25
Brevoort	....	50	Pit Hole Creek	50	80
Buchanan Farm	41	42	Rynd Farm	15	16
Central	25	50	Second National	....	25
Clinton Oil	1 10	....	Sherman & B	40	....
Empire & Pithole	....	10	Southard Pet	....	50
Home	10	....	United Pet. Farms	5	15
Manhattan	....	10	Union	4 00	....
National	....	3 00	United States	1 50	1 75

Miscellaneous Stocks—Quicksilver is quoted to-day at 26¼@26½; Wells, Fargo & Co., 24¼@25¼; American, 53¼; Adams, 57¼@57¾; United States, 55@55¾; Merchants' Union, 28¼@28¾; Western Union Telegraph, 38@38½; Pacific, 95¼@96; New York Central, 135@135¼; Erie, 70¼@70¾; Hudson River, 141¼@142½; Reading, 96@96¼; Bankers' and Brokers' Custom House, 10¼@12; Wallkill Lead, $18@20; Rutland Marble, $15 70@16.

Government Stocks.—U. S. Securities are in moderate demand, and are thus quoted:

U. S. 6s, 1881, coupon	116½@116¾
U. S. 5-20s, 1862, coupon	111¾@112¾
U. S. 5-20s, 1864, coupon	109¾@109¾
U. S. 5-20s, 1865, coupon	109¾@110
U. S. 5-20s, July, 1865, coupon	112½@112¾
U. S. 5-20s, July, 1867, coupon	112¾@112¾
U. S. 10-40s, coupon	105¾@101¾
U. S. 7-30s, June, large	109 @109½
U. S. 7-30s, July, large	109 @109½

Foreign Exchange is quiet, but rates remain upon a basis admitting of the shipment of eagles at a moderate profit. We quote:

London, (prime bankers')60 days'	110 @110½
London, (prime bankers') sight	110¾@110½
London, prime commercial	— @ —
Paris, (bankers') long	5.13¾@5.12½
Paris, (bankers') short	5.11¼@5.10
Antwerp	5.16¼@5.13¾
Swiss	5.16¼@5.13¾
Hamburg (bankers')	36½@36¼
Amsterdam (bankers')	41¾@41½
t (bankers')	41½@41¾
Bremen (bankers)	79¾@79¾
Berlin (bankers)	71¾@72

Gold is firm at 139¾@140¼.

American silver sells at 6¼@7c. below the price of gold. Mexican dollars are nominal at 103¼@103¾ in gold.

Capital is very abundant on call, and for temporary use large sums could be obtained at a merely nominal rate. The leading brokers are borrowing on Government securities at 3@4 per cent. Business paper of undoubted character is readily negotiated at 6 per cent., and choice selections can be done at a still lower rate.

There is no spring to business, and a want of life and buoyancy characterizes the movements in every department of trade.

The following will show the exports of specie from the port of New York for the week ending June 6, 1868:

June 2—Steamer Hammonia, Hamburg—	
Silver bars	$174,574
Gold bars	97,579
American gold	450,000
Mexican dollars	17,850
Foreign gold	120
June 3—Steamer Scotia, Liverpool—	
Gold bars	156,475
Silver Bars	75 832
American gold	1,070,350
June 4—Steamer Bremen, Bremen—	
American gold	318 800
Mexican dollars	28,010
Foreign silver	1,200
June 4—Steamer Tripoli, Liverpool—	
American gold	7,000
June 4—Steamer Moro Castle, Havana—	
American gold	120,000
Spanish doubloons	51,000
French gold	76,600
American silver	10,000
June 6—Steamer France, Liverpool	
American gold, bars and silver	58,000
June 6—Steamer City of Baltimore, Liverpool—	
American gold	423,727
June 6—Steamer Borussia, Hamburg—	
American gold	75,013
Silver bars	277,862
Gold bars	63,599
Mexican silver	22,000
Total for the week	$3 575,594
Previously reported	37,159,712
Total since January 1, 1868	40,735,306
Same time in 1867	20,088,211
Same time in 1866	37 477,535
Same time in 1865	15,514,556
Same time in 1864	25,625,170

The imports of specie at this port during the week ending June 6 was as follows:

June 1—Steamer Emma Dean, Curacoa—	
Silver	$277
Gold	2,362
June 1—Steamer St Laurent, Havre—	
Gold	118,110
June 5—Schooner Prairie Bird, Laguna—	
Gold	91
Silver	2,650
June 6—Steamer Ocean Queen, Aspinwall—	
Silver	300
Gold	4,400
Total for the week	$128,190
Previously reported	3,262,373
Total since January 1, 1868	$3,390,563

Copper is dull. A few forced sales of Detroit and Lake Superior, just arrived, have been made at 23c. although the quotation is 23½c. Baltimore quiet with small sales at 23c. The sales of the week do not exceed 400,000 lbs. including 100,000 lbs. Quincy for export, at 23½@23¾c.

The English market is unchanged at £76 10s. for Chili pig.

Tin entirely nominal at 24@24½c. for Straits, 24½c. for English, and 27½c. for Banca, all gold.

The English market is quoted at 92 shillings for Straits; a decline of 1 shilling.

Spelter—6¾@6¾c. gold for Silesian, without wholesale transactions.

Lead—6 30-100@6¾c. for ordinary foreign.

Zinc.—Sheet is scarce and firm, but not very active, at 12@13c. cash from store.

Petroleum—Is firm at 15 cents for crude, and 32 cents for refined, in bond.

Received since January 1—

1868		bbls.	373 692
1867		do.	439,518
Export since January 1—	1868.		1867.
From New York	19,278,744 gals.		12,309,583
Other ports	14,573,356 do.		11,535,230
Total	33,852,100 gals.		23,844,813
Same time, 1866		gals.	21,525,743
" " 1865		do.	4,567,655

THE IRON TRADE.

NEW YORK, Friday evening, June 12, 1868.

Scotch pig iron has been more active during the week past, with sales of about 600 tons, Langloan ex-ship on private terms; Glengarnock No. 1 may be quoted at $39@39 50, with sales of about 200 tons; No. 1 Coltness is worth $41 50 by steamer. In Gartsherrie we note the sale of 50 tons from yard at $41 50. American pig is dull and scarce, and No. 1 may be quoted at $38. Grey Forge is offering at $34, with but little business. White and mottled may be quoted at $30@31. In Russia sheet we notice the sale of 200 packs only, p. t. Old rails are worth $32½@33, gold. We note 150 tons of old bridge sold at $45 75, cash. New rails are worth $51, gold. We quote sales of 2,000 tons foreign at $51@51 50. Store prices of bar are unchanged, with but little business.

Several of the most solid business men and capitalists of Fond du Lac, Wisconsin, are about to organize a joint stock company, with a view to the erection of a furnace and rolling mill at that place.

We have advices from England to the 30th ult. The puddlers' strike, for practically it is now reduced to that branch of the iron workers, continues to agitate and disturb the trading interest in Staffordshire. The course which the men are pursuing is productive of the greatest embarrassment to principals, and doing an incalculable amount of mischief to the trade. Out of 167 blast furnaces in the district only 80 are now in operation. The pig iron market is, however, a shade more favorable.

The Swansea, South Wales, correspondent of the London *Colliery Guardian*, writes that the iron trade improves but slowly, and that there is little if any greater demand than existed some three or four weeks since. "A few cargoes are occasionally shipped for the United States, and also for some of the Continental ports, and a little inquiry has sprung up upon the home account, but the works are not as a whole fully employed, and there is an absence of that general activity which characterized the trade some two or three years since. Prices rule, as they now have for a very long time past, exceedingly low, and consequently wages are low also. With the opening of the summer months the emigration mania has again set in, and large numbers of puddlers, furnacemen, and general laborers in the iron works of the interior find their way down to the seaports, *en route* to the United States or Australia."

BOSTON, June 13, 1868.

There is no change to notice in Scotch pig iron. The market for both it and American remains the same with a steady but moderate demand. The sales have been at $42@44 for Gartsherrie and other brands. American pig is selling at $40@44, and charcoal at $45@60 per ton. There is a better demand for bar iron at previous prices. The sales have been at $85@90 for English and American common, and $95@100 for refined. Russian sheet iron is firm at 13@14c. per lb.

Imports of pig iron from Jan. 1 to June 6:

	1868.	1867.
From Great Britain, tons	3,198	14,948
Coastwise ports, tons	4,766	3,656

PHILADELPHIA, June 10, 1868.

Pig iron continues dull, and prices are weak and unsettled; sales of Anthracite at $36@38 for No. 1; $35 for No. 2; and $32@34 per ton for hard. Manufactured iron is firmly held at full prices.

Lehigh Valley Iron Trade.

The following table shows the amount of Pig Iron transported over the Lehigh Valley Railroad for the week ending June 6, 1868, and for the season to that date.

From	Tons.	Total
Carbon Iron Co	210	4,505
Lehigh Valley Iron Co	175	5,250
Thomas Iron Co	870	12,670
Lehigh Crane Iron Co	855	11,955
Allentown Iron Co	1,055	7,600
Robert Iron Co	105	4,490
Glendon Iron Co	830	10,980
Other shippers	740	8,012
Total	4,840	65,662

Lake Superior Iron Trade.

Receipts of Ore and Pig Iron at Marquette, up to and including Saturday, May 30, 1868, by the Marquette & Ontonagon Railroad.

IRON ORE.

	Previously reported.	For week end'g May 30.	Total.
Lake Superior Iron Co	7,022	3,633	10,655
Cleveland Iron Co	2,794	1,468	4,262
Marquette Iron Co	1,120	706	1,826
Washington Iron Co	3,188	1,409	4,597
New England Iron Co	1,239	709	1,948
Edwards Mine	2,124	....	2,124
Pittsburg & Lake A. Iron Co	2,549	2,041	4,590
Ore to Local Furnaces	5,499	429	5,928
Total Iron Ore, tons	25,535	10,395	35,930

PIG IRON.

Morgan Iron Co	1,498	297	1,795
Greenwood Iron Co	328	....	328
Bancroft Iron Co	1,236	87	1,323
Collins Iron Co	811	....	811
Michigan Iron Co	1,429	337	1,766
Total Pig Iron, tons	5,302	721	6,023
Total Ore and Pig Iron, tons	30,837	11,116	41,953

Market Prices.

NEW YORK, June 12, 1868.

DUTY.—Bars, 1 to 1¼c. per lb.; railroad, 60c. per 100 lbs.; boiler and plate, 1¼c. per lb.; sheet, band, hoop and scroll, 1¼ to 1¾c. per lb.; pig, $9 per ton; polished sheet, 3c. per lb. Payable in gold.

STORE PRICES.

Anthracite, No. 1, best	$38 00@39 00	Bar, Swedes, ord'y sizes	— — 150 00
" " 2x, fdry	36 00 37 00	Bar, Eng. and Am., rl'd	95 00 100 00
" Grey Forge	34 00 35 00	Bar, Eng. & Am., com.	85 00 90 00
Scotch Pig, No. 1	39 00 42 00	Sceoll	125 00 170 00
Charcoal, cash	45 00 65 00	Ovals and half round	120 00@150 00
Old Wrought sc'p, tm yd.	47 50 — —	Band	1 5 00 — —
" " " fm. val.	45 00 — —	Horse Shoe	125 00 — —
English rails, gold	51 00 51 50	Rods, ⅝@3-16 inch	100 00 160 00
American " at works	75 00 — —	Hoop	133 00 185 00
American Bar Iron		Nail Rod, per lb	9 10
Common, per ton	80 00 85 00	Sheet, Rus., Med. Nos.	17 18
Refined, " "	85 00 90 00	Sheet, a'gle, D. & T. com	5 7
Old Railroad Iron	47 00@	Rails, Eng., gold, ton	52 00 52 50
		Rails, American	78 00 80 00

STEEL.

English, cast (2d and 1st quality) per lb	18 @23
English Spring (2d and 1st quality)	10 @12½
English Blister (2d and 1st quality)	11½ 20
English Machinery	13½ 16
English German (2d and 1st quality)	14 16
American Blister, "Black Diamond,"	11½ 17
American, Cast, Tool " "	21 23
American, Spring " "	10 13
American, Machinery " "	— 14
American German " "	10 13

PITTSBURGH, June 6, 1868.

PIG IRON AND BLOOMS.—The *Commercial* says: "The business of the week in crude irons has been light. There has been very little change since our last report. Holders of iron are firm at present figures, and it is anticipated that prices will stiffen, owing to the fact of the greater part of the furnaces in Mahoning and Shenango Valley being out of blast.

We quote the following sales:

ANTHRACITE.

40 tons No. 1	$41 00	4 mos.
100 tons No. 3 Red Short	36 00	6 mos.
100 tons Gray Forge	38 00	4 mos
20 tons " "	36 00	cash.
80 tons Red Short	36 00	9 mos.
100 tons Gray Forge	36 50	4 mos.
30 tons Gray Forge	36 50	4 mos.

BITTUMINOUS COAL SMELTED FROM LAKE SUPERIOR ORE.

500 tons Forge Iron L. S. ore, at furnace	$35 00	4 mos.
75 tons No. 3 Open Gray Forge (F. B.)	37 00	6 mos.
120 tons Medium Gray Forge, at furnace	32 50	cash.
120 tons Medium Open Gray Forge, at furnace	33 75	4 mos.
120 tons Open Gray Forge, at furnace	35 50	4 mos.
60 tons " " " "	35 00	4 mos.
75 tons " " " "	35 00	4 mos.
25 tons " " " wharf	35 00	cash.
50 tons " " " from railroad	37 00	4 mos.
30 tons " " " from yard	37 50	4 mos.
20 tons " " " "	38 00	4 mos.
580 tons Low Grade, at furnace	31 00	4 mos.

CHARCOAL.

36 tons Hanging Rock, No. 1 Foundry	$44 00	5 mos.
290 tons " Medium	41 50	6 mos.
40 tons Fancy Forge Iron	51 00	cash.

IRON AND NAILS.—There is nothing new to report in the iron market. The demand for the week has been fair, and prices unchanged. Sheet and plate iron are in good request.

IRONTON, Ohio, June 4, 1868.

The *Register* says: "The metal market continues languid. Prices are not firm at quotations, and slight concessions are sometimes made. There is a growing feeling among holders, that prices will not be maintained at the present figures very long, but will give way this summer. Shipments are light, but receipts are very heavy.

"Our quotations this week are:

Mill, hot blast	$36 00@$37 00
Foundry, hot blast	38 00@ 39 00
Cold blast	55 00@ 60 00
Bituminous forge (Belfont)	37 00

"Manufactured iron is not the least relieved from its former stagnancy. Orders are dreadfully limited. Prices still hold at 3¾@4¼c. The LAWRENCE Iron Works commenced work last Monday.

"A good demand continues for nails. Rates $5 for 10d. The nail mill was stopped last Monday and Tuesday, in consequence of a strike among the coal diggers. The breach was soon filled by the diggers returning to old prices. The mill went again into operation yesterday.

"Monitor Furnace is meeting with perfect success. It produces largely, and the quality of the iron is excellent."

THE COAL TRADE.

NEW YORK, June 12, 1868.

The unsettled state of the weather, making the shipment and transportation of coal precarious, together with the strike among the "heavers and trimmers" at Philadelphia, have had a tendency to make trade dull here. Prices remain unchanged; good qualities bring fair prices. Freights from Elizabethport to some of the Eastern points of shipment are from 5 to 10 cents higher.

It is our sad duty this week to chronicle the death of an esteemed friend, and an honored member of the coal trade. Mr. Benjamin F. Ely, of the firm of B. F. Ely & Co., of this city, expired on Tuesday last at the residence of his partner in Bethlehem, Pa. Mr. Ely was only 29 years of age, but was endowed with rare tact as a business man. His fine abilities made him a representative man in the trade. He leaves a large circle of young friends, who met in Trinity Building yesterday and passed a series of resolutions in commemoration of their high appreciation of his great worth.

The amount of coal exported from the port of New York for the week ending June 9, was:

Exports for the week	tons.	1,639
Do. from January 1st	do.	21,777
Do. same time last year	do.	32,663

BOSTON, June 10, 1868.

English Cannel is quiet at $20 per ton, with no sales of any importance. In Sydney the sales have been at $8@8 55; and Pictou at $7 30@7 70 per ton. Cumberland has been selling at $8@8 25 per ton here, $4 75 delivered in Baltimore, and $4 35 in Georgetown. Penn and Westmoreland Gas has been selling at $7 20 per ton delivered in Philadelphia. Anthracite has been in steady demand at $6@6 50 by the cargoe, and $7@7 50 in retail lots.

Our Boston correspondent writes under date of June 11: "The new bill of lading seems to be adopted very generally, still the trade think it should be modified. There has been a strike upon the Richmond wharves, the laborers insisting upon advanced pay. The Reading road manage this difficulty, and the probability is that the men will resume work in a day or two. In the meantime all immediate shipments are stopped and consequently an accumulation of vessels will no doubt tend to reduce freights to probably $2 50. Freights have been $2 60@2 65. Prices of coal remain the same as last quoted. Freights from New York may be quoted at $1 75@2 00; from Georgetown or Cumberland there is a tendency to advance, and $2 10@2 25 is now demanded. The market is now unsettled."

PHILADELPHIA, June 10, 1868.

The market continues dull. We quote Locust Mountain lump and steamboat at $3 25@4 40; do. broken, $3 35@3 60; do. egg, $3 60@4 00; stove, $4@4 15; Red Ash egg and stove, $4 10@4 50; Lehigh lump, steamboat and broken, $5; do, prepared, $5; do. chestnut, $4 25.

The Wilksbarre (Pa.) *Record of the Times* of the 10th inst. thus speaks of the prospects of the coal trade of its locality and of the doings in some of the mines:

"The Lehigh Coal and Navigation Company has been compelled to expend vast sums of money on its railroads to replace its navigation and to secure coal, creating a heavy indebtedness, the interest upon which must be met before dividends can be expected upon stock, and the depressed condition of the coal trade is not encouraging for high rates of toll and transportation.

"The Pine Ridge shaft has been passing coal through the breakers, and may be deemed in operation again. Gen. Ely has purchased part of Mr. Parrish's interest in this colliery, and is taking some part in its supervision.

"Mr. Swoyer thinks he has opened the mammoth vein of coal near his new slope east of the plank road in Plains township. We have not seen it yet. The Baltimore mine running east from the foot of the new slope towards Mr. Parson's land on Laural Run, divided a middle slate increasing from a few inches to many feet, seeming to prove the theory which we have never fully believed—that the two veins known as the 'Wilcox mine, now the Union Company's Mill Creek Mines, were the Baltimore or Mammoth seam divided by from fourteen to sixteen feet of slate rock. The slate has thinned out in the Baltimore slope to a few inches again. At least it is so reported, and leaves the question still involved in doubt. The Mineral Spring Coal Company, which works the property of Parsons and Flick, have two seams which may be the Mammoth and Wilcox, but this union of the Baltimore coal, if properly reported, approaching the Mineral Spring, would throw doubt on the theory."

The Clinton (Pa.) *Republican* has the following: "An arrangement of much importance to the coal, iron and lumber interests of this State, has been consummated between the several canal lines on the Susquehanna river and its branches, embracing the Wyoming Canal, the West Branch and Susquehanna, the Pennsylvania, and the Susquehanna and Tide Water canals. They respectively bind themselves to operate their canals as one line on all through tonnage, to pro rata all through tolls, and to enlarge all of their canals by the spring of 1871 to six feet depth of water. It is estimated by the parties interested that the above arrangement will effect a reduction of one-half on the vast tonnage of anthracite and bituminous coal, lumber and iron."

The Alexandria Canal and aqueduct continue in good order, and we learn from the papers of that city that large numbers of boats are arriving there.

A Washington correspondent writes: The British Minister, it is said, has addressed a letter to the Secretary of State, calling attention to the fact that the Canadian government admits American coal free of duty; that it has resisted the pressure of Nova Scotia coal interests to impose a duty of 50 cents a ton on foreign coal, which would exclude American coal from Western Canada, a million dollars worth of which was consumed in that section last year, and that this course was adopted by the Canadian government in the hope that the government of the United States would legislate reciprocally. The British Minister asks whether this government is prepared to consider the question. The Secretary of the Treasury has replied that Congress having abrogated the old reciprocity treaty, he does not consider it proper to reopen the question unless Congress shall indicate its desire to do so. The papers are before the Committee of Ways and Means.

The following table exhibits the quantity of Coal passed over the following routes of transportation for the week ending June 6, 1868:

	1867.		1868.		INC. OR DEC	
	WEEK.	YEAR.	WEEK.	YEAR.	WEEK.	YEAR.
Phil. & Reading R. R.	80,455	1,545,488	62,432	1,352,367	d 18,023	d 218,121
Schuylkill Canal	28,388	290,731	31,415	315.019	i 3,027	i 24,288
Lehigh Valley R. R.	52,510	810,069	49,735	1,069,560	d 2,755	i 259,491
Lehigh Canal	33.912	195,618	31,723	231,912	d 2,188	i 36,294
Scranton North	7.915	161 559	13,812	186 685	i 5,897	i 25,126
" South	26 358	547,408	19,620	466.064	d 6,738	i 81,344
Penn'a Coal Co. Rail	19,851	296,342	23,903	336.13[illegible]	i 4,052	i 39,797
Penn'a Coal Canal	359	5,277	947	6,95[illegible]	i 588	i 1,676
Del. & Hudson Canal	38,130	373,563	47,880	390,615	i 9.750	i 17,052
Shamokin	12.749	185,231	14,435	182,733	i 1,686	d 2,498
Trevorton	2,124	16,706	490	9,317	d 1,638	d 6,388
Short Mountain	3,385	23,489	3,025	36,871	i 360	i 13,431
Lykens Valley C. Co.	954	22,805	1,608	23,802	i 654	i 10 995
Broad Top	4,678	101,514	3,040	99 325	d 1,630	d 2,185
W'mstown Col'y, E.	3,519	38,907	4,459	70,982	i 940	i 32,075
Wyoming South	2,282	26,551	12,233	42,679	i 9,951	i 16,128
Lehigh & Susq. R.R.	.....	.....	22,350	270,188	.....	.....
Total	317,568	4,641,206	343,107	5,101,215	239,882	781,892
	.....	.....	317,568	4,641,206	.....	.....
Increase	.....	.....	25,539	460,009	.....	.....

Schuylkill Coal Trade.

BY RAILROAD AND CANAL, FOR WEEK ENDING JUNE 12, 1868.

	RAILROAD.	CANAL.
St. Clair	35,504	.....
Port Carbon	5,794	12,690
Pottsville	627	2,090
Schuylkill Haven	19,114	1,203
Auburn	4,214	.....
Port Clinton	3,313	88
Company's use	2,383	.....
Total for week	70,849	16,071
Previously this year	1,352,367	315,019
Total for season	1,423,216	331,090

Report of Coal Transported over Lehigh Valley Railroad and Canal

For the week ending June 6, 1868, compared with same time last year:

SHIPPERS.	RAILROAD. Week. Tons.	RAILROAD. Total. Tons.	CANAL. Week. Tons.	CANAL. Total. Tons.	Grand Total.
FROM MAUCH CHUNK.					
Summit Mines	....	....	1,990	5,919	5,919
Room Run Mines	....	....	11,561	91,050	91,050
Total	....	....	13,552	96,969	96,969
WYOMING REGION.					
Franklin Coal Co	1,116	2,924	....	....	2,924
Audenried	....	50	....	....	50
Lehigh & Susqueh'na	....	....	....	....	....
Germania Coal Co	24	4,967	250	1,162	6,129
Wilkes Barre C. & I	....	13,024	3,200	27,810	40,894
Warrior Run	....	10,700	....	....	10,700
Parish & Thomas	398	29,339	90	2,789	32,128
New Jersey	408	9,363	61	1,632	10,995
Union Coal Co	....	2 432	....	....	2,432
Wyoming C. & T. Co.	....	3,227	....	....	3,227
East Boston Coal Co.	....	....	....	256	256
Morris & Essex Mut'l	....	1,428	....	....	1,428
Chauncey Coal Co	....	....	186	374	374
Hillman & Son	259	6,397	....	....	6 397
Bowkley, Price & Co.	....	149	....	....	149
Mineral Springs	425	9,624	....	....	9,624
Valley Coal Co	....	....	....	....	....
Enterprise C'y, J.H.S	657	14,812	92	380	15,192
G. B. Linderman & Co	....	....	....	....	....
Washington Coal Co.	....	....	....	....	....
West Pittston	48	175	....	....	175
John Horton	....	....	95	473	473
Shawnee	150	3,620	471	2,807	6,427
Consumers Coal Co.	....	2,16	....	....	2,160
Harvey & Bro.	207	2,138	....	183	2,321
Wyoming Valley	193	2,273	....	....	2,273
Henry Colliery	....	513	....	....	513
New England	451	2,122	....	....	2,122
Del. & Hudson C. Co.	....	11	....	46	57
Other Shippers	9	23	197	1,034	1,057
Total	4,352	121,646	4,646	3,902	125,548
FROM B. M. REGION.					
N.Y. & L. [T.H. & Co	1,602	28,581	188	750	29 331
Honey Brook Coal Co.	2,610	52,905	1,706	7,167	60,072
Ger Pa. Coal Co	1,322	21,786	320	1,738	23.524
Spring Mountain	3,968	50,090	277	650	50,740
Coleraine W.T.C. & Co	1,235	35,928	856	4,285	40,213
B. Meadow (D. W.)	108	362	....	....	362
John Connery	....	....	....	....	....
Lehigh Zinc Co	....	....	....	....	....
Spring Brook	....	....	....	....	....
Other Shippers	12	206	921	266	472
Total	10,561	189,862	3,435	14,857	204,719
HAZLETON REGION.					
Central Coal Co	....	....	....	....	....
Ashburton Coal Co	....	433	....	64	497
Mt. Pleasant [Halsey	284	8,463	64	815	9,278
Hazleton (A. P. & Co)	5,171	122,151	2,006	18.153	140,304
East Sugar Loaf	4,887	77,922	94	561	78,583
Mount Hall	....	21,914	....	....	21,914
Latimer (A. P. & Co)	667	19.449	377	1,391	78,483
Stout Coal Co	951	16,950	168	3.640	20,590
Harleigh Coal Co	1,006	25,491	547	4,798	30,289
Ebervale Coal Co	1,276	37,787	479	7,025	44.812
Jeddo (G. B. M. & Co)	3,414	68.682	1,735	12,520	81,202
Woodside (J. C. Co.	486	8,028	223	3,159	11,187
Highland	992	30.148	721	5,249	35,397
Cross Creek (C. B.)	446	12.438	444	2,399	14,837
C'l Ridge [S.W. & Co.	1,798	46,713	1,692	10,603	57,316
Buck Mountain	643	28,376	283	4,128	32,504
Other Shippers	....	....	....	1,676	1,676
Total	22,045	503,258	9,114	76,187	579,445
U. LEHIGH REGION.					
U. Lehigh Coal Co	517	28,346	789	4,332	32,678
Other Shippers	....	....	....	....	....
Total	517	28,346	789	4,332	32,678
MAHANOY REGION.					
Mt. Rose Coal Co	48	1,071	....	....	1.073
Mount Etna Coal Co.	136	3,305	187	465	3,770
Mahanoy Col. [N.M.M	339	12,893	....	....	12,893
Coplay Colliery	1,107	11,801	....	....	11,801
Glendon	1,177	19,244	....	....	19,244
Primrose Colliery	462	6.947	....	....	6,947
E. S Silliman	1,554	46,744	....	....	46.744
McNeal Co	2,508	36,814	....	....	36,814
Knickerbocker	893	30,734	....	....	30,734
Thomas Coal Co	1 360	16,376	....	....	16,376
Williams & Herring	363	4,829	....	....	4,829
New Boston Coal Co.	1,582	24,289	....	....	24,289
Shamokin Coal Co	....	....	....	....	....
Caledonia M. & M	723	11,380	....	....	11,380
Coal F'm Cataw'sa RR	....	....	....	....	....
Other Shippers	....	15	....	88	103
Total	12,258	226,447	187	553	227,000
Grand Total	49,735	1,069,560	31,723	231,912	1,301,472
Same time last year	52,510	310,069	33 912	195,618	1,005,687
Increase	....	259,491	....	36,294	295,785
Decrease	4,352	....	2,188	....	....

Cumberland Coal Trade.

By B. & O. RAILROAD.—The shipments over the Baltimore and Ohio Railroad, for the week ending June 6, were as follows:

From Cumberland & Pa. R. R., via Cumberland:

Consolidation Company		2,370 09
Borden	do.	1,210 18
Allegany	do.	152 04
Midland		178 08
Millothian		56 17

From George's Creek via Piedmont.

George's Creek C. & I. Company		1,391 19
Central	"	3,152 08
Atlantic	"	860 16
Swanton	"	173 06
Potomac	"	1,579 04
Franklin		527 00
Hampshire		2,348 05
Total		14,000 10

From Eckhart Railroad.

C. C. & I Co	2,767 15
Total	16,768 05

BY C. & O. CANAL.—There were despatched from this port, during last week, 14,875 17 tons of Coal, forwarded by the following companies:

American	4,263 11
Borden	1,661 02
Central	4,484 09
C. C. & I.	1,268 01
Consolidation	1,017 15
H. & B.	1,185 04
Midlothian	990 15
Total	14,875 17

Lehigh and Susquehanna Railroad, Week ending June 6.

WHERE FROM.	WEEK. Tons. Cwt.	TOTAL. Tons. Cwt.
WYOMING REGION.		
Haverill	.....	.....
Newport Coal Co	.....	.....
Valley Coal Co	.....	.....
Warrior Run Mining Co	.....	.....
Parrish & Thomas	117 12	4,886 06
New Jersey Coal Co	175 11	6,129 09
Lehigh & Susquehanna	.....	15 10
Germania Coal Co	441 08	8,291 01
Franklin "	.....	.....
Audenreid Improvement	.....	.....
Wilkesbarre Coal & Iron Co	7,467 19	69,744 06
Union Coal Co	.....	2,040 07
Mineral Spring	.....	6,029 06
H. B. Hillman & Son	.....	1,303 17
Bowkley, Price & Co	.....	228 14
Wyoming	.....	3,006 09
Henry	202 05	2,052 16
J. H. Swoyer	95 10	2,673 06
Everhart Coal Co	.....	.....
Albrighton, Roberts & Co	186 05	374 08
Shawnee	471 01	3,656 13
Fris & Essex Mutual	.....	78 19
[illegible]are & Hudson Co	197 18	3,797 06
Pine Ridge Colliery	202 00	590 16
Consumers Coal Co	109 00	1,050 06
Harvey & Brothers	.....	184 11
Total Wyoming Region	9,666 09	116,234 06
UPPER LEHIGH REGION.		
Upper Lehigh	3,077 10	47,730 00
Total Upper Lehigh	3,077 10	47,730 00
HAZLETON REGION.		
A Pardee & Co	2,049 04	22,813 14
Linderman & Skeer	94 00	561 04
Sharpe, Weiss & Co	1,719 10	15.185 12
W. S. Halsey & Co	64 04	1,421 02
Harleigh Coal Co	787 19	10,436 11
G. B. Markle & Co	1.820 17	19.245 13
Ebervale Coal Co	479 07	10,105 19
Stout Coal Co	168 16	6,033 09
Buck Mountain Coal Co	490 17	5,911 12
Coxe Brothers & Co	497 15	3,247 09
Ashburton Coal Co	.....	64 06
Highland Coal Co	721 16	4,116 18
Pardee Bro. & Co	377 05	2 997 13
Jeddo Coal Co	334 11	3,886 14
Mount Hall	.....	.....
Other Shippers	.....	196 06
Total Hazleton Region	9 606 01	106,224 03
" Upper Lehigh	3,077 10	47,730 00
" Wyoming	9,666 09	116,234 06
Grand Total	22,350 00	270,188 09
Corresponding week last year	.....	.....
Increase	.....	.....
Decrease	.....	.....
Forwarded South from Mauch Chunk by rail	7,839 13	126,329 17
Delivered on line L. & S. R.R. above Mauch Chunk	493 14	37,064 04
Delivered at Coal Port for shipment by Canal	14,016 13	106,794 08
Total	22,350 00	270,188 09

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

At New York, June 13, 1868.

Schuylkill R. A., choice	$6 00@$....		Schuylkill Chestnut	4 50	....
" Ordinary	5 75	....	Lehigh W.A Lump Old Co	5 00	....
" W. A., Lump	5 00	....	Lehigh Broken	4 87½	....
" Steamboat	5 00	....	" Egg	4 87½	....
" Broken	5 00	....	" Stove	5 12½	....
" Egg	5 50	....	" Chestnut	4 37½	....
" Stove	5 50	....	Shamokin	5 50	....

SPECIAL COALS.—DEALERS' QUOTATIONS.

Diam'd Vein R. A., Sch'kill	6 00	....	Old Co.'s W. A. Lehigh	5 50	....
Locust Dale W. A., "	5 50	....	Mt Pleasant	5 00	....
Honey Brook " Lehigh	5 50	....	Broad Mountain	....	....
Harleigh " "	5 50	....	Buck Ridge W. A., Sh'kin	5 50	....
Spring M'n " "	5 50	....	H. Heils, E. S'klin, Lorb	5 50	....
Sugar Creek " "	5 50	....	New England Red Ash	5 25	....
Ashburton " "	5 50	....	Wyoming	5 50	....

Dealers in these Coals may be found in our advertising columns.

At Philadelphia, June 13, 1868.

Lehigh Lump and St'mb't.	5 00@....		Henry Clay, Egg & Stove	....@4 40	
" Broken and Egg	5 00	....	Locust Mount Lump and Steamboat	3 25	3 40
" Stove	5 50	....	" Broken	3 35	3 60
" Chestnut	4 25	..	" Egg	3 60	4 00
Schuylkill R. A.	4 25	4 50	" Stove	4 00	4 15
" Chestnut	2 70	2 75	Lorberry Coal	4 50	....
" W. A. Lump	3 25	...	Shamokin	....	....
" Broken	3 25	3 50	Franklin, (Lykens Valley)	5 00	....
" Egg and Stove	4 10	4 50	Broad Top	4 60	....
Schuylkill Chestnut	2 75@....				
Hill & Harris, Egg & Stove	....	4 30			

Scranton Coal at Elizabethport, June 13, 1868.

(Corrected weekly by D. L. & W. R. R. Co.)

Lump	$4 00@....		Egg	4 50	....
Steamer	4 25	....	Stove	5 00	....
Grate	4 25	....	Chestnut	4 25	....

Prices for Pittston Coal at Newburgh, June 13, 1868.

(Corrected weekly by Penna. Coal Co.)

Lump, per ton of 2240 lbs.	$4 15@....		Egg " " "	4 25	....
Steamer, " " "	4 15	....	Stove " " "	4 00	....
Grate " " "	4 25	....	Chestnut " " "	4 15	....

70 cents additional to New York.

Lackawanna at Rondout, June 13, 1868.

Lump	$4 25@....		Egg	$4 45@....	
Steamer	4 35@....		Stove	4 75	....
Grate	4 35@....		Chestnut	4 25	....

65 cents additional to New York.

Lehigh Coal at Elizabethport, June 13, 1868.

Lump	5 00@....		Chestnut	4 25	....
Steamboat and Broken	4 75	....	Stove	5 00	....
Egg	4 75	....			

Wilkesbarre Coal at Hoboken, June 13, 1868.

(Corrected by Wilkesbarre Coal & Iron Co.)

Lump	$4 50@....		Egg	4 50@....	
Steamer	4 50	....	Stove	4 95	....
Broken	4 50	....	Chestnut	4 15	....

At Baltimore, June 13, 1868.

Wilkesbarre & Pittston W. A. by car	$5 25@5 50		From wharf or yard, 50c. to 75c per ton additional		
Lykens Valley R. A. by car	....@ 5 55		Retail, del'd, per 2,240 lbs	7 00@7 50	
Sunbury & Shamokin R. or W A. by car	5 00	5 50	George's C'k and Cumberland f. o. b. at Locust P't for shipping	....@4 75	

At Havre de Grace, Md.

Wilkesbarre or Pittston, W. A., on board	$....@4 85		Sunbury or Shamokin, R. or W. A., on board	....@4 85	
Trevorton R. A., on board	5 25		Lykens V'y, R. A. on b'd.	....@5 50	

Havre de Grace is the terminus of Susquehanna and Tide Water Canal.

At Georgetown, D. C. and Alexandria, Va.

George's Creek and Cumberland f. o. b. ..... $....@ 4 35

Prices of Gas Coals.

June 13, 1868.

PROVINCIAL. Duty, $1 25	Coarse. Gold.	Slack. Gold.	AMERICAN	Coarse. Currency.	Slack. Currency.
Block House	$1 75	$ 75	Westmoreland Co.	$5 50	$3 00
Gowrie	1 75	75	Despard Coal Co.	8 25	8 00
Lingan	1 75	75	Penn	8 50	8 00
Sydney	2 13¾	71¼	Newburgh Orrel Gas	8 50	8 00
Pictou	2 13¾	1 18¾	Delivered in New York.		
Little Glace Bay	1 75	1 00			
International Co.'s	1 75	....			

Prices of Foreign Coals.

Duty $1.25 per ton.

Corrected weekly by PARMELEE BROS., 32 Pine Street, N. Y.

Liverpool Gas Caking	$ 9 50	Liverpool House Cannel	18 00@19 00
" " Cannel	14 00	" " Orrel	16 00@18 00

Per ton 2240 lbs., Ex. ship.

PRICES FROM YARD.

Liverpool House Orrel, scr'd	$18@20	Livp'l House Can'l, scr'd	22 00@— —

per ton 2000 lbs. delivered.

Coal Freights.

(Corrected Weekly.)

Rates of Freight from Newburgh

RIVER.		EASTERN.	
On "Pittston" Coal, by boats and barges of the Pennsylvania Coal Company, per ton of 2,240 lbs.		Stamford	$1 25
Troy and West Troy	$ 55	Norwalk	1 25
Albany and Greenbush	50	Bridgeport	1 25
Coeymans	45	New Haven	1 25
Coxsackie and Stuyvesant	40	New London	1 40
Hudson & Catskill	35	Norwich	1 50
Sangerties and Barrytown	35	Mystic	1 45
Rhinebeck and Rondout	30	Stonington	1 45
Po'keepsie and New Paltz Land.	25	Sag Harbor	1 45
Fishkill Landing	20	Bristol	1 55
Cold Spring and West Point	20	Newport	1 55
Peekskill	40	Fall River	1 55
Haverstraw	45	Providence	1 60
Sing Sing and Nyack	50	Dighton	1 60
Tarrytown and Piermont	50	Warren	1 60
Yonkers	55	Pawtucket	1 60
The Coal must be discharged with all reasonable dispatch, at the expense of the consignee, who shall also pay wharfage on the boat. Boatmen will tend guy while unloading.		New Bedford	1 75
		Boston	1 90
		East Cambridge	1 90
		Salem	2 10
		Newburyport	1 90
		Portsmouth	2 00
		Portland	1 95

Freights on Coal Sea-borne from Port Richmond, Philadelphia.

June 3, 1868.—From Philadelphia & Reading Railroad Wharves, Phila., to

Boston	2 50	2 60	New York	1 25	1 30	
Portland	2 50	2 60	Chelsea	2 50	2 60	
Portsmouth	2 75	2 90	Cambridge	2 75	2 80	
Lynn	2 65	2 75	Danversport	— —	2 60	
Salem	— —	2 50	New Bedford	2 10	2 20	
Providence	2 10	2 20	Sag Harbor	— —	2 10	
New London	— —	2 00	Staten Island	— —	1 30	
Brooklyn	1 25	1 30	Roxbury	— —	2 75	
Bangor	2 25	2 50	Saugas	— —	2 65	
Bath	2 65	2 85	Derby	— —	2 00	
Dighton	— —	2 30	Norwalk	— —	1 75	
Williamsburg	— —	1 30	Albany	— —	1 40	
Belfast	— —	2 75	West Chester	— —	1 50	
Gardner	— —	3 12	Hackensack	— —	1 30	
Cambridgeport	— —	2 60				

From Elizabethport and Port Johnston.

Albany	$ 90@— —		New London	$1 15	— —
Boston	1 96	— —	Newport	1 40	— —
Bridgeport	1 00	— —	New York	60	— —
Fall River	1 45	— —	Norwalk	1 00	— —
Hartford	1 50	— —	Norwich	1 35	— —
Hudson	1 00	— —	Pawtucket and towing	1 60	— —
Lynn	— —	— —	Portland	1 90	— —
Middletown	1 25	— —	Portsmouth	2 10	— —
New Bedford	1 50	— —	Providence	1 10	— —
Newburyport	2 15	— —	Salem	1 75	— —
New Haven	1 00	— —	Augusta	2 25	— —

Rates of Transportation to Tide Water.

[BY RAILROAD.]

To Port Richmond.—(Philadelphia.)

Philadelphia and Reading R. R. from Schuylkill Haven $2 00

The following are the drawbacks allowed on all coal shipped East of New Brunswick and South of Cape Henry, until further notice:

	Drawback.	Freight.	Nett.
Lump	$1 25	$2 00	$ 75
Steamboat	1 15	2 00	85
Broken	1 00	2 00	1 00
Egg	65	2 00	1 35
Stove	50	2 00	1 50
Chestnut	75	2 00	1 25

From Port Carbon, 25 cents per ton more.

To Elizabethport.

L. V. Railroad from Mauch Chunk to Easton	$ 69
C. R. R., N. J., Easton to Elizabethport	1 06
	1 75
Shipping Expenses at Elizabethport	25
Total	2 00

To Port Johnson.

L. V. R R	$ 69
C. R. R. of N. J.	1 12
Shipping Expenses	25
Total	2 06

To Hoboken.

L. V. R.R.	69
Morris & Essex R.R.	1 12
Shipping Expenses	25
Total	2 06

[BY CANAL.]

To Port Richmond.

From Schuylkill Haven to Port Richmond	$1 00
Freights and tolls by Raritan Canal	1 90
	2 90
Drawback	30
Total	2 60

To New York.

From Mauch Chunk to New Brunswick, by Lehigh, Del. Div. and Del. & Raritan Canal	$ 99
Freights through	1 25
Towage	20
	2 35

To New York via Morris Canal.

Lehigh Canal	$ 34
Morris "	40
Towage	10
Freight	1 55
Total	2 39

Expenses from Mauch Chunk to Jersey City for Re-shipment.

Lehigh tolls (net)	$ 34
Morris "	34
Freight	1 50
Re shipping	30
Total	2 48

Provincial Freights.

TO NEW YORK.		TO BOSTON.	
Sydney	....	Sydney	$2 75
Lingan	....	Lingan	2 75
Cow Bay	....	Cow Bay	....
Port Calidonia	$3 09	Port Calidonia	2 50
Little Glace Bay	3 00	Little Glace Bay	2 5

Foreign Freights.

New Castle and Ports on Tyne	£13@15 keel.
Liverpool	12s. 6d.@15s. ton.

New York Imports of Metals, &c.

The following will show the imports of Metals, &c., at the port of New York from foreign ports, for the week ending June 5, 1868. The quantity is given in packages, unless otherwise specified.

Metals, &c.	Quantity.	Value.		Quantity.	Value.
Anvils	18	159	Iron, other, tons	1,434	34,781
Brass Goods	3	85	Lead, Pigs	10,542	55,864
Bronzes	7	1,438	Metal Goods	65	15,897
Chains and An	63	2,177	Nails	9	711
Copper	..	372	Needles	8	2,786
Cutlery	48	17,243	Nickel	5	2.981
Guns	107	7,711	Old Metal	....	9,155
Hardware	54	11,743	Platina	1	1,466
Iron, hoop, tons	12	466	Percussion Caps	2	408
Iron, Pig, tons	1,005	14,586	Saddlery	3	536
Iron, Railroad bars	17,320	85,605	Steel	6,391	96,200
Iron, Sheet	10	573	Spelter, lbs	1,061,583	45,267
Iron tubes	770	2,302	Tin, boxes	12,281	83,386
			Wire	377	4,693

BOSTON STOCK MARKET.

(By Telegraph.)

BOSTON, June 12, 1868.

The following were the prices of mining stocks bid to-day:

Calumet	—	Quincy	—
Copper Falls	22	Cary Improvement	10¾
Franklin	13¼	Isle Royal	—
Hecla	40	Water Power	21½
Hancock	2¾	Bos., Hart & Erie RR	15½
Minnesota	3	Rockland	—

SAN FRANCISCO STOCK MARKET.

A telegram from San Francisco, dated June 10, to Messrs. LEES & WALKER, Bankers, 33 Pine street, this city, quotes stocks as follows:

STOCKS.	Bid	per	f't.	STOCKS.	Bid	per	f't.
Gould & Curry	112	@	—	Belcher	283	@	285
Savage (per share)	161	@	162	Uncle Sam	..	@	..
Chollar Potosi	290	@	295	California	..	@	..
Ophir	15	@	..	Imperial (per share)	205	@	208
Hale & Norcross	115	@	116	Alpha	70	@	71
Crown Point	114	@	—	Kentuck (per share)	382	@	390
Yellow Jacket	1,195	@	1,200	Cal. Steam Nav'n Co.	No sales		

MONTHLY METAL CIRCULAR.

NEW YORK, June 4, 1868.

COPPER.—During the past month the price remained unchanged at 24 cts. for Detroit, and 23¼ cts. for Baltimore, but since a few days the market is unsettled. The winter product of Lake Superior has commenced to arrive and several parcels of Detroit have been forced from wharf at 23¼ cents. Baltimore is quoted at 23½ to 23¾ cts.

The Lake Companies have probably sold the greater part of their expected receipts for June and July, but it remains to be seen how much will be offered again from purchases on speculation. The manufacturers have, generally speaking, bought little, and, with the first revival in the general trade of the country, the moderate supply of Copper will no doubt be felt.

110 tons Lake have been shipped to the Continent. 20 tons Minnesota are reported sold at 19¾ cts., gold, a very high price compared to 23¾ cts. currency, which was paid a few days ago for 50 tons Quincy, for Havre.

The London market was quoted, on the 22nd of May, £76 10s. for Chili Bars, a decline of £1.

LEAD.—100 tons ordinary Spanish were sold at 6¼ cts., but it is generally held at 6¾ cts. The importations for May were 3,300 tons, and the deliveries for consumption 3,000 tons.

The stock is 4,400 tons,
against 3,300 " on 1st June, 1867.
2,200 " " " 1866.
5,700 " " " 1865.

RUDOLPH C. WINTERHOFF, 64 Beaver street.

AMERICAN
Journal of Mining.

WESTERN & COMPANY, PROPRIETORS.

ROSSITER W. RAYMOND, EDITOR.

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☞ Mr. T. P. PEMBERTON is Editor of the Mechanical Department and Agent for the JOURNAL OF MINING.

☞ Correspondents, exchanges and others addressing us should be *extremely careful* to write "JOURNAL OF MINING," instead of "MINING JOURNAL," to ensure safe carriage. Communications intended for publication should be plainly written, and on one side of the paper only.

NEW YORK, SATURDAY, JUNE 13.

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THE SUTRO TUNNEL—ITS NECESSITY.

A little more than a year ago, we alluded to the fact that $365,000 worth of stock had been taken by several of the mining companies along the line of the proposed Sutro tunnel in order to aid in carrying out that praiseworthy undertaking. The capital stock proposed was $5,000,000. It was supposed, from representations made, that if the mining companies upon the spot, took stock in the enterprise to the amount of $500,000, Capitalists in New York would step in and take the much larger fraction of $4,500,000. But a cloud seems to have hung over the project. Capital, in amount sufficient to justify a prosecution of the work has not been taken. Moneyed men stand aloof. So much capital has been sunk of late, in mining enterprises, managed by ignorance, fraud, and folly, that a general lack of confidence is the natural result, The magnitude of the apparently difficult undertaking, and the fear that moneys invested would be lost, should there be a failure in the completion of the tunnel, seems to have been reasons why private capital has not undertaken the work. It is proposed by means of the Sutro tunnel to cut the Comstock lode at a point about 1,800 feet below the outcrop of the Gould and Curry mine, the highest point upon the ledge. The tunnel is to be ten feet high and twelve feet wide, thereby admitting a double track railway. Its estimated length is about seven miles. It is thought, after careful examination, that the cost of this tunnel will be about $8,000,000. The advantages that would result from cutting through this proposed tunnel can hardly be estimated in dollars and cents. The forty-seven steam engines that are now employed in raising water from the various mines upon the Comstock lode would be no longer necessary. An immense amount of low grade ores could then be taken out of the mine and worked at a handsome profit. It would then be possible to work these mines at a depth not merely of a thousand feet, but at least three thousand feet below the line of the tunnel—thus more than doubling the future yield of these mines. We do not lay much stress upon the argument that it would "demonstrate to the world that our mineral lodes are continuous in depth." Upon that point we entertain no doubt whatever. VON COTTA, a geologist who has had probably as much to do in the study of mineral veins as any man living, says: "The extension of veins of ore in the direction of their dip is certainly in most cases far greater than they have been hitherto opened by processes of mining. As veins are worked down into the earth the difficulties become greater and greater, and beyond a certain point it becomes impossible to follow them. One can well say, that with the present method of working, this point will be reached at a perpendicular depth of 3,000 feet, and indeed it may be safely presumed that the working of veins can never be carried further than a perpendicular depth of 10,000 feet. Under these conditions, it is very probable that mineral veins continue to far greater depths than they can ever be worked by the miner. As yet, in case of a proper vein, it has never been shown that, in the direction of its dip, it has been followed completely to its end, that is, to a point where the fissure ceased. The most of the reported experiences of the giving out of fissures, or of their no longer containing ores in the direction of their dip, clearly rest only upon the circumstances that the ore in the veins was, in the main, unequally distributed, and that it is more difficult to seek for ore in the direction of the dip than along the strike of the vein. So long as the fissure continues, there remains the possibility of its being found of greater width, and filled out with ores, at still greater depths." We take it for granted, therefore, upon the very best authority, that our mineral lodes are continuous in depth. What we want is the precious metal that lies at those greater depths. The successful completion of a work like the proposed Sutro tunnel would indeed give impetus to other enterprises of like character in the mining regions. It would undoubtedly stimulate, in an indirect, as well as in a direct way, the mining industry of the country to an almost unparalelled degree. That there is no difficulty connected with a work of this kind, we have only to allude to the tunnel completed in the year 1864, which drains the mines of the Hartz. Though the yield of these mines is only about half a million dollars per annum, and the additional depth of drainage secured only three hundred feet, yet it was deemed advisable to construct a tunnel fourteen miles in length. The advantages to be gained, in the case of that tunnel, sink into very insignificance when compared to the benefits that would result from a cutting through of the Sutro. In the latter case, without doubt, hundreds of millions of dollars worth of precious metal would be added to the world's treasure. The question now arises, how is the Sutro tunnel to be built? Three or four years would be time enough for accomplishing the noble work, but for reasons previously stated, private capital cannot be obtained. We say, by all means, let Congress advance the loan of $5,000,000 in bonds, asked for by the Nevada State Legislature. It can be done at no risk. The securities offered are ample. It is no less a duty that Congress owes to itself, that she takes a hand in an enterprise of this character, than that she should open up the mining regions by means of the Pacific railway. It would be another step in the right direction, and in so far as it goes, just as important. We understand that the shaft of the Bullion mine upon the Comstock lode is already down 1,200 feet. At the present cost of mining, with, of course, the continual increase in expense of drainage, raising of ores, ventillation, etc., as greater depths are attained, it is clear that when this company shall have worked down upon the vein 1,200 feet further, the profitable working of it will be thereafter at an end, and probably very much sooner. And the same holds good of all the mines upon the Comstock lode. At a depth, at the most, of 2,500 feet, at the present, and the probable future rate of labor, these mines, with their present yield of $16,000,000 per annum, would become to all intents and purposes worthless. Cut through the Sutro tunnel, and you give them a new lease of life. and as remarked, hundreds of millions more of treasure will be won thereby.

The question then is simply this; whether these mines in the course of five or six years are to be abandoned, and ruin brought upon a mining region that is now full of busy life and industry, or, are they, by means of a little aid at just the right time, to be so opened up, that perhaps even for a century, they will continue to pour their treasures into the coffers of the nation? We believe our Congress is too well informed upon this matter to be misled by any superficial argument.

NOTEWORTHY FACTS IN REGARD TO CALIFORNIA MINING.

As we suggested at the close of our last week's review of the general features of J. ROSS BROWNE's report, we now propose to look somewhat in detail into points that are likely to be of interest to the general reader. We do not intend in our editorial articles to give, to any extent at least, extracts from the mining statements which make up the greater part of the report; but will rather confine ourselves to topics that have a broader significance. In order, however, that we may likewise give to our readers a comprehensive view of that department of the work, extracts from the more important of such statements will be found in the columns of our paper devoted to the mining summary.

A description of what is called the "Mother lode," furnishes material for the second section of the report. In view of the fact that hereafter gold bearing veins are to form the main basis of successful mining in California, now that the surface diggings are being exhausted, a few extracts upon the distinguishing features of this mother lode, which, says Mr. BROWNE, is in many respects the most remarkable metalliferous vein in the world, cannot be amiss. The report says:

"Other veins have produced, and are producing more, but no other has been traced so far, has so many peculiar features, has exercised so much influence upon the topography of the country about it, or has been worked with profit in so many places. The great argentiferous lodes of Mexico and South America, the most productive of precious metal of all known in history, cannot be followed more than six or eight miles; while this California vein is distinctly traceable on the surface from Mariposa to the town of Amador, a distance of more than sixty miles! The general course of the vein is very nearly northwest and southeast, or, to be more precise, it is north forty degrees west. If a straight line were drawn on the map from Mariposa to Amador, the mother lode would be in several places two or three miles distant from the two, but usually within a half a mile of it. The dip of the vein is always to the eastward, and usually at an angle of forty-five or fifty degrees to the horizon. The width varies from one to thirty feet; that is, the main vein as worked; but it is accompanied by branches or companion veins, so that the width of the vein matter is sometimes nearly a hundred feet. In some places these side veins are known to be branches separated at the surface from the main vein by 'horses;' in others they are different in material, and do not unite at the deepest workings. The most remarkable side veins are those of talcose slate, which in some places can be traced for miles. They are from two to twenty feet wide, and rich in gold. We do not find, in our books, mention of any similar auriferous deposit in other countries; but in California a number of these have been found, remote from the mother lode, as well as near it. The pay chimneys are usually large, regular, and are either vertical or have a slight dip to the north. In the companion talcose veins the pay chimneys are not distinctly marked, nor are the character and limit of the lode well defined. One peculiar characteristic of this remarkable vein is the effect it appears to have upon the topographical features of the country. The streams seem to have made their beds in placers where the mother lode is split up with a number of branches, as at the Mercede, Maxwell's creek, Tuolume, Stanislaus, and Mokelumne rivers; while in those placers where the lode is wide and solid there are high hills."

The great length and width of this vein are among the more important of its peculiar features. The anomalous character of this deposit of ore will stand out in a more prominent light when we remark that, of the nine hundred different veins that have been discovered in the mining region of Freiberg, Saxony, it is seldom one is found whose width amounts to more than two feet. As to whether this is a fissure vein or not the report says it is a matter of little practical importance. Upon the mineral mass with which the vein is filled out, we are informed that the gold is generally in fine particles, and is distributed evenly through a large portion of the lode in the pay chimneys; that there is very little of the rock entirely without gold. The sulphurets, it is said, are not very abundant nor very rich, and when found consist almost exclusively of iron and copper pyrites, without those admixtures of lead, arsenic, antimony and zinc, which interfere seriously with amalgamation in some other lodes. The quartz of the mother lode is usually white and hard, and in most of the pay chutes near one wall or the other. Ribbon rock, or, in other words, rock with numerous black seams lying parallel with the wall, is found. But we have perhaps dwelt long enough upon the characteristics of this truly wonderful vein, upon which it seems that about one hundred and forty mining companies are the possessors of claims.

As we cast our eye along the pages of the work taken up with mining statements, we notice in connection with a description of the North American claim in Placer county, a paragraph headed "Nitro-Glycerine." So much has been, and is being said in regard to the merits and demerits of that explosive agent, of the economy of its use, etc., in comparison to that of gunpowder, we will give here the substance of the remarks made upon its use in that particular instance. The report says:

"The number of men now employed is 15; last year it was 28. One of the chief difficulties in this claim is the removal of the stratum of pipe-clay which rests on the pay gravel and must be carried off in the sluice. It is too broad to be piped away, therefore it must be blasted into small pieces. Previous to this year powder was used, but now Mr. Swenson, one of the partners of this claim and the pioneer manufacturer of nitro-glycerine in California, supplies that fluid, which is so much better than gunpowder that 15 men do more work in 1867 than 28 men did in 1866. The nitro-glycerine shatters the pipe-clay into a multitude of little pieces, whereas powder broke it into a few large ones, so that after a powder blast the miners had to reduce the large lumps with gads, for which there is now little use. It costs about $2 per pound, and is preferred by the miners after they once become accustomed to it. No accident has happened with it on this claim, although sometimes two or three dozen blasts are set off in a day. The smoke disappears from it sooner than that from gunpowder, but it is more injurious."

It would seem that in this instance there has been great gain in the use of nitro-glycerine in the place of gunpowder. We must, however, not forget to take into account the fact that this is a "placer"—that the blasting is done very nearly or quite upon the surface of the ground. There is, consequently, but very little opportunity, in comparison to underground workings, for the smoke from the explosion to exercise its injurious effects upon the miners. The mine, in this case, in so far as nitro-glycerine is concerned, would seem to partake very much of the nature of quarries, in which, it is well-known, its exclusive and continuous use has not been combined with serious consequences. In this instance, moreover, the economy seems to have resulted from the shattering of the clay at the moment of the explosion. It is, perhaps, a matter of question whether there would have been the same economy had the blasting taken place in rock, instead of clay. Be this, however, as it may, we certainly wish to the use of this agent of explosion all the success possible, and hope that the well-known disadvantages now connected with its use in the underground working of mines may be, in some way, speedily counteracted or removed.

The mining ditches of California furnish matter for an interesting section of this report. Of their great influence upon the mining interests of the region, it is remarked, that

"Ditches occupy an important place in the mining of California. Indeed it may be said that without them the mines of the State would be relatively insignificant. At least four-fifths of the gold is obtained with the assistance, direct or indirect, of ditch water. There are very few springs in the mining regions, the bed rock being usually slate, with perpendicular cleavage, through which the water sinks down to the lowest levels. The permanent streams are found only at long intervals, and run in deep, steep, and narrow channels. Nature has furnished no adequate supply of water near the surface for towns, or for quartz mills; so they, as well as the hydraulic pipes and sluices, must depend upon ditch water, which thus is an indispensable requisite to the production of four-fifths, perhaps nineteen-twentieths of the gold."

Notwithstanding their immense value as regards an increased production of gold, it seems many of them have been the means of unprofitable investments.

"The big ditches (says the report), almost without exception, proved unprofitable. It is estimated by competent men that not less than $20,000,000 have been invested in the mining ditches of California, and that their present cash value is not more than $2,000,000.

The South Yuba canal, we are told, is an exception to this. It remains a triumph, both as regards engineering skill and financial ability. Although the large ditches, as a class, are unprofitible, many of the small ones pay very well. This seems to result from the fact that they are short, on favorable

ground, and have no high flumes liable to be blown down by winds, or broken down by snows.

An extract from Mr. Langley's work, entitled "The Pacific Coast Directory," incorporated in the report, tells us that there are 5,328 miles of these artificial water-courses for mining purposes constructed in the State. This has been done at a cost of about $15,575,400. In addition thereto there are subsidiary branches the estimated length of which is about 800 miles. And still further, it is said there are yet several hundred miles of new ditches in course of construction.

WEIGHT FORCE AND POWER.

There exists among many persons a confusion in the use of these words, which it would be very desirable to correct. This confusion originates not only in the wrong understanding of the words, but also of the ideas they convey. When, for instance, we read in the *Scientific* (?) *American*, editorial remarks like these: "power may drive machinery but a lubricator is better," it shows that there is no very clear idea of *Power* when a lubricator is considered to be a substitute for, and an improvement upon it. When again the same scientific (?) paper says (Vol. xv., p. 367): "The mechanical force developed by the change of one cubic inch of water into 1,700 cubic inches of steam is nearly one ton," it shows that there is no clear idea of *Force*, as the mention of a weight alone, say a ton or a pound, without considering its motion, conveys no idea of force at all.

Weight means nothing more nor less than the idea the word conveys; namely, a certain amount of matter. It cannot possibly be used to convey the idea of force. To speak of a ton, pound, or ounce weight gives no idea of force, since an ounce weight in motion produces an infinitely greater force than a ton weight at rest, of which the force is zero. Therefore any scientific writer that speaks of a mechanical force of one ton simply proves himself to be very ignorant in the proper use of words.

The statement of a *Force* requires the combination of two ideas; first, a certain amount of matter, or a certain weight; and secondly, a certain space through which it moves. This is force and nothing more. It is not power, much less a certain amount of horse-power, and to speak of 33,000 pounds raised one foot high as a horse-power, as is often done, is another error of the same kind.

The word power involves three ideas: A certain mass or weight, a certain space through which the mass moves, and a certain time during which the motion occurs. The true definition of a horse power is 33,000 pounds raised one foot high, in *one minute*, or, after the French decimal system, which amounts to nearly the same thing, 75 kilograms raised one meter high in one second.

To recapitulate: *Weight* signifies nothing more than a mass of matter; *Force* involves the idea of matter and space; while in the word *Power* we have the three ideas of matter, space and motion combined.

Now as to the application. When we suspend a weight and keep it unmoved, it exerts neither force nor power; when we cause it to descend, it exercises a force; but the amount or measure of power obtained by this descent can only be arrived at by considering the velocity of this descent. Therefore, when we say 33,000 pounds descends one foot in one minute, or 550 pounds one foot in one second, or 55 pounds ten feet in one second, we have a horse power; but when 55 pounds only descends one foot in one second, or ten feet in ten seconds, we obtain the power of one man, which is estimated to be one-fifth or one-tenth of that of a horse.

A man can raise 33,000 pounds one foot high easy enough, either by means of machinery, or by subdividing it into 500 parts, of 66 pounds each; but it will be found that he cannot possibly accomplish this task in one minute, as is possible for a horse by means of the proper contrivances. All that a man can do, is to raise the 33,000 pounds with the right kind of machinery, one foot in eight or ten minutes, or, to lift every second 66 pounds one foot high. In five hundred seconds, or a little more than eight minutes, he will have accomplished his task of lifting 500 times 66, or 33,000 pounds, one foot high.

The clear understanding of these principles would often save, to many a man, both money and time, in preventing him from attempting the accomplishment of utterly impossible things.

NEW PUBLICATIONS.

ROSS BROWNE'S REPORT, *Revised Edition.*—A large and revised edition of J. ROSS BROWNE'S REPORT on the Mineral Resources of the States and Territories West of the Rocky Mountains, with an elaborate historical account of the early voyages to Lower California and the settlement of that country by the Jesuits; its resources, products, and recent exploration; and much new matter of great interest connected with the Pacific slope, carefully compiled by Mr. BROWNE, will soon be issued by Messrs. D. Appleton & Co., of this city, and H. W. Bancroft & Co., of San Francisco. The book will be printed on fine paper and handsomely bound, and will make about 800 pages. A splendid steel engraving of the author by F. Halpin, Esq., of this city, will be furnished to subscribers.

DR. ALEXANDER S. TAYLOR, of Santa Barbara, a gentleman of great learning and research, is the author of the historical part of the work.

CAPT. C. M. SCAMMAN, of the U. S. Revenue service, furnishes, an interesting and elaborate report on the coast, bays, harbors, etc., of Lower California.

DR. VEATCH, the discoverer of Borax Lake, an indefatigable naturalist and explorer, contributes an valuable paper on Cechos Island. Other eminent gentlemen have assisted in the preparation of the data comprised in this valuable work.

Scientific Meetings.

POLYTECHNIC BRANCH OF THE AMERICAN INSTITUTE.

GOLD-BEARING ROCKS — MONSTER FURNACES — HORSE-SHOE MACHINE — LIFE SAVING APPARATUS—NEW HARNESS-BUCKLE—COMPOSITION VALVE.

The last meeting, before adjournment, of this society, was held on Thursday evening last, at the usual time and place. Notwithstanding the very unpleasant character of the weather, a large and appreciative audience were present. Prof. S. D. TILLMAN, as usual, occupied the chair. The auditors were first entertained with a reading of numerous scientific items by the Chairman. One of these items, on gold-bearing rocks, says: "Sir RODERICK MURCHISON, in the new edition of his "Siluria," has modified the views first put forth by him as to the distribution of gold in the earth's crust. His most recent conclusions are: That looking to the world at large, the auriferous veinstones, in the lower silurian rocks, contain the greatest quantity of gold. That where certain igneous eruptions penetrated the secondary deposits, the latter have been rendered auriferous, to a limited distance only, beyond the junction of the two rocks. That the general axiom before insisted upon remains, that all secondary and tertiary deposits (except the auriferous detrius in the latter) not so specially affected, never contain gold. That as no unaltered, purely aqueous sediment ever contains gold, the argument in favor of the igneous origin of that metal is prodigiously strengthened; or, in other words, that the granites and diorites have been the chief gold producers, and that the auriferous quartz-bands in the Palæozoic rocks are also the result of heat and chemical agency.

Under the head of "monster furnaces," we learn from one of the items that the Rosedale and Ferry Hill Iron Company's establishment, at Ferry Hill, England, which until lately consisted of seven iron furnaces, each about 82 feet high and 22 feet in diameter, has been enlarged by the erection of two furnaces, each 105 feet high by 28 feet in diameter. One of these has been put into use, and has proved itself a signal success. The air is supplied by two powerful blast engines, and the material fed by two efficient hydraulic hoists and one balance hoist. When all these furnaces are at work, they will produce annually about 180,000 tons of pig iron.

Mr. O. A. HOWE was now introduced, who called the attention of the audience to his machine for making horse-shoes. The machine is arranged, it is claimed, for making a horse shoe grooved centrally on the under side, so as to act much more effectually in preventing the slipping of horses upon pavements than the ordinary caulked shoe, but which has not been manufactured before the advent of this machine because of the difficulty of displacing the metal in the centre of the under surface of the shoe in order to form the groove. This machine effectually performs this function, giving the proper grooved shape to the shoe without any waste of material, and is furthermore capable of making the ordinary shoe, either plain or caulked, at the rate of twenty shoes per minute, and, by a slight change and adjustment of parts, may be made to shape shoes of any desired size. The inventor also claims that by making the shoes grooved and complete for use, no expense is involved in fitting up by blacksmiths, as has always heretofore been required; and the cost of keeping a horse shod in good order is reduced nearly one half, as compared with the old method.

Mr. I. MENDELSOHN, President of the National Life-saving and Ship-ballasting Company, with the aid of an assistant, now gave a practical illustration, in so far as possible, without water, of the utility of the "Life-saving Apparatus," which was illustrated and described in last week's JOURNAL. Mr. VOORHIES exhibited a new kind of harness buckle, made of iron, with a covering of vulcanized rubber. He claimed that they were neat, cheap, durable, and very easily cleaned. Mr. SUTHERLAND brought forward a new arrangement for a valve, which he claimed was perfectly tight fitting. It was a composition valve. The disks are made of mica, rubber, shellac, etc. They are composed so as to withstand a heat of 600°. Dr. BRADLEY, in the early part of the evening, read quite an interesting paper upon the lives and fortunes of the two BRUNELS, noted in the history of English mechanical, railway, and naval engineering.

The closing hour of the meeting was devoted to an interchange of ideas upon the usual topic, street railways. The society then adjourned until the second Thursday in September.

Correspondence.

[To insure insertion of Correspondence in our columns the full name and address of the writer must be given.]

The Great Question.

PIONEER CITY, IDAHO TERRITORY, May 20, 1868.

EDITOR AMERICAN JOURNAL OF MINING:

Will any of your numerous chemical correspondents inform your readers of a cheap and simple process of working sulphurets by the wet way, in quantities of not less than five hundred pounds at a time, in the raw or unroasted state, whereby the gold and silver only is to be saved? Gold bearing sulphurets which consist chiefly of iron and copper pyrites with galena, resist the simple treatment which serves for the "free gold," viz., amalgamation with quicksilver in the stamp mill or grinding-pan, and will yield their treasure, only after having been subjected to the process of roasting, thereby freeing them from sulphur, arsenic and other substances inimical to amalgamation. It is, therefore, desirable that some cheap process may be found applicable to such localities as this, where fire-brick for the construction of furnaces and chemicals are expensive, whereby sulphurets of a gold-bearing character can be worked without roasting or the use of expensive chemicals.

JAMES DUNCAN.

[This is the great Metallurgical problem of the day, which may, or may never be solved.]—ED.

PROF. C. H. HITCHCOCK proposes to visit the gold mines at Elizabeth, New Hampshire, and will probably publish the results of his observations in that locality.

M. SIMONIN, the distinguished French Mining Engineer, will, we are informed, re-visit Colorado this summer.

Original Papers.

[WRITTEN FOR THE AMERICAN JOURNAL OF MINING.]

THE MICROSCOPE;

History of its Invention, its Geological Teachings, and its Uses for the Mines, Mineralogist and Chemist.

BY PROF. F. H. VAN DER WEYDE.

Continued from p. 330.

No. XII.—ARE THE DIATOMS VEGETABLE OR ANIMAL?

EHRENBERG considered the diatoms as the earliest, and lowest forms of animal life, and indeed their organism is so low that botanists at present have claimed them as plants. The chief argument in favor of this view is, that lime is the common covering for animals, as in the case of oysters, snails, etc., and that flint is a common covering for plants, as is seen in the bamboo, reed, and other straw, the cutting of which will blunt steel tools much more rapidly than the cutting or engraving into cameos and other ornaments of the hardest common shells that consist only of lime.

The theory that diatoms belong to the animal kingdom, is chiefly defended by the English microscopist, JABEZ HOGG. He maintains that careful examination under high microscopic powers, show that they possess *cilia* which are in constant motion; that they can move voluntarily across the field of the microscope; that, upon meeting with an obstacle they push it aside or change their course. He maintains that these cilia are placed around the central openings, and so completely under the control of the little living beings that they use them as paddles or propellers; that these filamentous organs are of so delicate a nature that, as yet, the strongest power of the best microscope has not enabled us to make out their true form and manner of attachment; that if other observers cannot see these cilia at all, the reason is that they have less powerful instruments, or perhaps a faulty manner of illumination, and that this is the reason why some of them flatly deny their existence. This is the case with DR. CARPENTER, the celebrated physiologist, as well as others.

Physiologists even hold, at present, that the living beings detected in the fresh semen of male animals, which are easily detected by a good microscope as myriads of very lively moving tadpoles with very long tails, and which formerly were supposed to be animaculæ endowed with volition, are nothing but ciliated living cells.

Against the argument that the moving cilia of the diatoms, even if they do exist, prove the volition of an organism, it is argued that there are many instances of such continually moving cilia, in many parts of the mucous membranes of animals, and even in plants. Even the bodily motion of the individual does not prove any animal nature, and much less volition, as small particles of camphor and large pieces of sodium move about rapidly on the surface of the water. The microscope also detects, in a solution of gamboge, a lively motion of small particles. Every chemist knows that any chemical action among the molecules of a substance is accompanied with motion; and, as between living plants and the medium in which they exist, a chemical action is taking place, motions may easily result in such a small living vegetable organism, in which the gravitating attraction is so small that it is easily surpassed by the molecular or chemical attraction. This is not the case in large structures, in which, always, the gravitating attraction of the earth is so large that it far surpasses all chemical or physiological action, and keeps the vegetable organism in its place, except allowing it to ramify and expand, and occasionally to float in the water, or even in the air. But the latter is, however, only the case when it is microscopically small.

I cannot omit to mention here in connection with the last mentioned particular, that during the last three years it has been found that fever and ague, prevalent in some localities, is caused by a very fine microscopic filamentous plant, existing in marshy districts, and rising from the ground at night to a height varying from three to six feet. When air contaminated with these fibres is inhaled, fever and ague is the result. The sun and a strong wind cause the plant to descend to the earth again, and for the time being the locality may be healthy. This at once explains why it is particularly injurious to sleep in low, moist localities, close to the ground. This plant has been called *Palmellæ Salisburii*. Full details were given two years ago in Dr. Hayes' *Medical Journal*.

Most investigators consider it, at the present day, a settled matter that three groups, namely, the *Diatmaceæ*, *Desmidiceæ*, and *Volvocineæ*, have been transferred from the animal to the vegetable side of organic life. From the foregoing it will be evident that it is somewhat difficult to choose between the modern theory and the orthodox doctrine of EHRENBERG that they are animalculæ, and that it is animal life alone which descends into this infinitesimal complexity. Here, as in all the fields of natural science, it is often impossible to draw a correct line of demarkation between two groups—to say where one begins and the other ends. The cause of this is that an unbroken chain extends through all nature. Apparent gaps are from time to time filled up by the expansion of our knowledge supplying the broken links. A most forcible illustration of this fact is found in the results of paleontological researches during the last half century. Also in inorganic nature, the lines of demarkation of different classes of minerals are often impossible, and even in the elementary substances we cannot exactly tell what, for instance, are metalloids and what are metals, from the fact that there are several substances which partake of the properties of both; for instance, selenium, telurium, arsenic, antimony, etc.

[TO BE CONTINUED.]

[MS. FURNISHED TO THE AMERICAN JOURNAL OF MINING BY HON. J. ROSS BROWNE.]

NOTES ON LOWER CALIFORNIA.—NO. V.

BY W. M GABB, ESQ., PHILADELPHIA, LATE OF THE CALIFORNIA GEOLOGICAL SURVEY.

[Continued from page 362.]

Another striking feature of this region is the peculiar manner of elevation of the mesa. It has not been lifted by an evenly distributed force; nor, like most mountain chains, by a folding along a given axis. The eastern side seems to have felt this force almost alone, the elevation of that portion lying to the west seeming to be due almost as much to the rigidity of the rocks as to the extension westward of the uplifting power. More properly speaking, the great force was exerted very nearly parallel with what is now the coast line of the Gulf, and from there, towards the Pacific, this agency diminished so gradually as to produce no breaks or even foldings worthy of mention. We thus have the whole width of this portion of the Peninsula tilted up by its edges from coast to coast, so that travelling eastward one can hardly realize the rise, until within fifteen or twenty miles of the east coast he finds himself on the verge of a precipitous descent of from two to three thousand feet in height.

This eastern escapement extends from near La Paz to near Moleje, with but few interruptions; and exhibits, nearly everywhere, the projecting edges of nearly horizontal beds of sandstone, sometimes unaltered, but usually metamorphosed. During the imperfect examinations which our limited time permitted us to make, I was unable to determine whether this sudden cutting off of the otherwise undisturbed beds was due to a gigantic fault, or whether the eastern slope of an anti-clinal axis had been carried away by denuding agencies. From what little we saw, strong arguments could be deduced in support of either hypothesis; but I prefer leaving the question an open one, content with having called the attention of future students to its solution. It is certain, however, that a well marked axis, if not several, exists further north, and even at the Sauce, near Loreto, the presence of a mass of granite at the base of the Sierra Gigantea, evidently exposed by denudation, seems to point rather to this agency as the means of solving the difficulty.

On the west side, the post-pliocene strata form a strip extending from below Magdalena Bay to near San Telmo, with but very few interruptions. The eastern margin of this belt is pretty clearly defined by the elevation of the mesa, rarely reaching but a few hundred feet above the level of the sea. It extends to the coast, except along that portion lying between the bays of Ballenas and San Sebastian, where the granite range of Santa Clara cuts it off. On the east side, near Loreto, it occurs as hills several hundred feet in height uptilted at an angle, as high in parts as 55°, and dipping to the N. E. This disturbance appears to be due, in a great measure, to the intrusion of a large mass of volcanic rocks, which separate the more modern formation from the mesa sandstone. The belt continues, with slight interruptions, to near the Sauce, where the post-pliocene sandstones, very full of fossils, lie horizontally, abutting against the face of uptilted mesa sandstones, which are here highly metamorphic.

Proceeding westward a mile or two, the older sandstones become horizontal, assuming this position by a gentle curve, their edges abutting against a mass of granite. Still further west, this granite mass is seen to underlie the undisturbed horizontal beds of the same sandstones which make the great mass of the mountain. Dykes of trachyte and porphyries cut alike the granite and sandstone, and, in a beautifully exposed section on the face of the Gigantea, can be seen running entirely to the surface of the mountain, over whose flat top they have spread a rocky mantle which extends almost to the plains of the Pacific.

[TO BE CONTINUED.]

Manufacturing and Mechanical Notes.

No. XXII.

Natural Lubricating Oils.

The conditions required of a perfect lubricator are as follows: It must not freeze or solidify at the temperature of our coldest winter days, say 10° below zero, Fahr., as is the case with sperm and lard oils, which freeze, some at 40°, some at 50°, and even at 60° above zero. It must not dry and form a gummy crust, like linseed oil, neither be a compound of fatty acids with glycerine, as all these oils become rancid by exposure to the air. It must be pure and perfectly transparent, and contain no gritty, earthy, or mineral matter which will attack machinery. It must not evaporate and leave the parts dry; not be too thin, but adhesive and stick to the parts. It must not be too thick, like tallow or frozen sperm oil, as those substances will not penetrate to the parts to be lubricated. Taking these conditions as requisites of a good lubricator, it would appear that there is still much room for improvement in the manufacture of some oils used at the present day. The practical value of what are termed natural lubricating oils is receiving much attention from manufacturers, engineers, and owners of machinery. These oils are not supplied in the condition in which they are pumped from the earth, but, by a mechanical process, are rendered entirely free from all grit, gummy or parrafinous deposits and water, so that under all circumstances a uniformity of grade and cleanliness is obtained. A report upon these natural oils by a distinguished analytical chemist, states that they are not only absolutely inexplosive but that they are superior lubricating oils, having the advantage over lard and sperm oils as they do not solidify or freeze at a temperature of 18° Fah. In experiments to determine the amount of volatile ingredients in certain oils when severally exposed to a temperature of 500° Fah., it was found that the natural oil lost in one experiment =1.16 per cent.; in another, =0.97; or, on the average, 1.07 per cent. Parrafine No. 1 lost =0.22 per cent.; parafine No. 2 lost 0.4 per cent.; lard oil lost =0.13 per cent.; and sperm oil 0,14 per cent. To determine whether the loss of 1.07 per cent. sustained by the natural oil was owing to some volatile and dangerous hydro-carbon, a larger quantity was heated to 500° Fah., and the volatile portion condensed. Only water was obtained by condensation.

To be, however, perfectly safe, a crucial experiment was instituted in the following manner: One cubic centimeter of the natural oil was introduced into a glass flask of the capacity of a pint; the bottle was then corked and the oil heated to a very high temperature; after this, the bottle was allowed to cool, the cork was removed, and a lighted match introduced; the match burned for a while quietly, and then ceased burning. This experiment was repeated with the same result. Had there been present the least quantity of benzine, or any other dangerous hydro-carbon, an explosion would have resulted on the introduction of the lighted match.

This natural oil is further exempt from the disadvantage of condensing the oxygen of the air, and thereby generating ozone, which is destructive to metallic substances; this is therefore a circumstance which speaks very much in favor of this natural oil with regard to its use as a lubricating agent.

The natural oil, in addition to being free from ether, grit or other matter, has properties that dissolve any gummy or even hard crust that is known to accumulate from some oils on the brasses of journals, and which is a source of great annoyance to engineers and machinists. It, therefore, does not "gum" or become thick, so that, even after machinery has been standing still for a length of time, it can be started without first cleaning off the old oil, which is not the case with common oils. Certificates and commendations from those who must be deeply interested in the subject of good lubrication, all point to the excellent qualities of natural oil, and when certificates unsolicited are sent by such parties as W. C. GUNNELL, U. S. Engineer, GEO. H. CORLISS, of Providence, R. I., GEORGE E. STEVENS, of the Grant Locomotive Works, Paterson, N. J., with many others, it is certain that engineers, manufacturers, and mill owners have thoroughly tested this excellent lubricator, and are satisfied with its properties. Samples and all further information may be obtained from SILAS ST. JOHN, at the office of the VOLCANIC OIL AND COAL COMPANY, No. 7 BROADWAY, NEW YORK.

NO. XXIII.

The Sampson Scale.

Recently, at a public trial of one of these scales, we had the pleasure of witnessing the interesting and severe tests resorted to, and of examining minutely its mechanism. Certainly it is an important and scientific combination of mechanical principles, whereby a greater degree of accuracy, equality, durability, compactness and simplicity is attained than in any of the scales commonly in use. We lately saw a mathematical calculation that demonstrated the scientific principles on which the scale works, and proved beyond a doubt the practicability of the invention. Its accuracy depends chiefly on its being built on the short lever principle, with comparatively no oscillations on the pivots or knife edges. The main levers being vertical and very short, they cannot spring, and, having no check rods, they cannot interfere with the free action of the platform, which rests at its four corners on four carriages, which, swinging freely by links, keep the platform perfectly horizontal, and preserve it from rubbing or jamming against the frames. By this judicious arrangement, the weight may be placed upon any part of the platform and still retain the same degree of accuracy. The wear and tear caused by the oscillations of the platform comes upon this system of yokes and links, and does not affect the knife or pivot edges, which are subject only to the almost imperceptible wear caused by the slight friction incidental to the poising of the weigh-beam, which in other scales is entirely upon the knife edges. Its compactness is remarkable, and can only be accounted for by the simplicity of its construction. This is practically illlustrated in its ready adaptation to weigh-locks for canals. The scales being suspended within, and bearing upon the side or chamber walls of the lock, do not require the ordinary house or superstructure for their insertion, thereby saving a large expense. By the aid of a screw attached to a lever, they can be adjusted or sealed in a few moments, thus doing away with the long and tedious process of filing and polishing. These scales have been in use a number of years in New York State—at the Morgan Iron Works, foot of Ninth street, East river; in the weigh-lock at Waterford, N. Y.; in the Penna. Coal Co.'s Yard, East Twenty-third street, and in many other localities. They have always given entire satisfaction, both in regard to correctness and durability, and from their simplicity no repairs have been required to keep them in proper order.

We understand that the Company are about to establish a permanent depot in Boston, with large and commodious warerooms for the more convenient supply of the New England States.

We would respectfully call the attention of our Boston readers who may feel interested, that they can see the scales in practical operation by calling at the well known piano factory of Messrs. CHICKERING & SONS, on Tremont street, or Messrs. GEO. M. WINSLOW & Co., coal and wood dealers, 228 Causeway street, Boston, Mass.

Personal.

KIT CARSON, the well known mountain trapper and guide, according to a letter from Fort Lyon, Colorado, died on the 23d of last month from the effects of the rupture of an artery in his neck. The deceased was born in Madison county, Kentucky, on the 24th of December, 1809, and was, consequently, in his fifty-ninth year. In 1847 he was a lieutenant in the United States army, and attached to the rifle corps, and during the rebellion he was promoted from rank to rank until he reached that of brigadier general. As an Indian fighter he was, perhaps, unequaled. A splendid shot, he is said never to have failed to kill a redskin that he fired at, and the number that fell beneath his aim must have been numerous. During the rebellion he served principally in New Mexico, where he distinguished himself by his untiring prosecution of hostilities with his savage foes, then at war with the Government.

THE HON. W. E. DODGE, of this city, it is stated by the Missouri papers, has invested $50,000 in the Madison county tin mines, of that State. Mr. Dodge is said to be a practical tin operator, having been, for a number of years, largely interested in the celebrated tin mines of Cornwall, England. As a matter of fact, we can't say whether this is so or not; if it is, on the part of the speculators it is indeed a splendid *dodge*. Our advice to Mr. Dodge would be to *dodge* out of the matter as soon as possible.

W. B. SKELLENGER, recently identified with the mining districts of the southern States, and of old with the early history of the far western mines, is gone to New Brunswick to examine the gold mines there and report on their value. He has with him, we are informed, all the necessary implements for accomplishing his purpose in a thorough manner, and is accompanied by quite a party of adventurous spirits, desirous of prospecting that country for its mineral wealth.

WHITWORTH, the most eminent engineer in England, has just performed an act of munificence worthy of Peabody. He has devoted £100,000 to the endowment of thirty scholarships of £100 a year for the education of engineers. Special instruction in the mechanical arts is a great desideratum in any country. Mr. Whitworth is a self-made, practical mechanic, and his inventions and improvements in machinery are of the most remarkable character.

AT a meeting of the Trustees of the Rensselaer Polytechnic Institute, in Troy, on Thursday evening, Thos. C. Brinsmade, M.D., for several years the Vice-President of the Institute, was elected to the Presidency, and Hon. Geo. Gould, long a member of the Board of Trustees, was chosen to the position vacated by the President elect. Hon. F. S. Thayer and A. B. Morgan were elected to fill vacancies in the Board of Trustees.

Mr. WINWOOD READE, of the London Geographical Society, has determined to resume his African travels. He will sail, in a few weeks for the Gold Coast, and will probably commence by exploring the Assinie River, of which scarcely anything is known. Mr. Reade will travel under the auspices of the society, and with the liberal co-operation of Mr. Swanzy, a Fellow of the Society.

PROF. E. P. EVANS, of Michigan University, the translator of Stahr's Lessing, is engaged in writing an epitome of the history of German literature. The work is to be written in the German language, and while it will be of service to the general reader, it is intended especially as a text-book for students of German.

WILLIAM CHAPMAN, of Chapman borough, Northampton county, Pa., is building a Masonic temple, which he intends to present, handsomely furnished, to the brethren in that vicinity. It is estimated to cost $20,000.

HENRY WELLS, Esq., the well known President of the Wells-Fargo Express Company, has erected a Young Ladies' Seminary at Aurora, N. Y., which is to be opened in September.

LUTHER W. CLARK, who, for the past twenty years, has been intimately connected with the interests of Lake Superior, died recently in Boston.

HENRY BURDEN, the eminent iron-worker and inventor, is building a $50,000 Presbyterian church in Troy.

Patent Claims.

Interesting to Miners, Millmen, Metallurgists, Oil-Men and Others.

78,089.—CONCENTRATOR.—Joshua Hendy, San Francisco, Cal.

I claim, 1st. The annular groove, I, declining from a certain point to an opposite or discharging point, in combination with a vibrating or oscillating pan or concentrator, whose surface is convex or curvilinear, as described.

2d. The discharge valve or gate, M, when constructed and arranged to operate substantially as described.

3d. The T-shaped distributer, K K, pierced with holes, b b b, and having slots, b' b', said distributers being either stationary or movable, and when movable the notched edge, c c c, with pawls or their equivalents, d d, operating therein for driving the said distributers, substandially as and for the purpose described.

4th. The agitators or stirrers, a a a, attached to stationary or radial arms, x x, or their equivalents, with an oscillating pan, as described.

5th. The peculiar construction of the frame, A A, it being triangular in form, the projecting ends, B B, for the crank shaft, the point, A', in combination with an oscillating pan, substantially as described.

6th. The overreaching supports or braces, F F, connecting at the point, F', and in which the upper end of the vertical shaft turns, in combination with the frame, A A, with the projecting ends, B B, and oscillating pan, substantially as described.

7th. The peculiar construction of the ball crank pin, N', when employed in an oscillating pan, substantially as described.

8th. The oil groove, H, either in the hub of the pan or on the shaft, G, and the oil cavity, J', above the hopper, for lubricating the sleeve and step, with an oscillating pan, substantially as described.

72,297.—CONVERTING WROUGHT IRON INTO CAST IRON AND STEEL.—Alexander Lisk, Philadelphia, and Adam Woolever, Allentown, Pa.

78,317.—EXPLOSIVE COMPOUND.—Alfred Noble, Hamburg, Germany, Assignor to Julius Bandmann, San Francisco, Cal.

I claim the composition of matter, made substantially of the ingredients and in the manner and for the purposes set forth.

78,352.—APPARATUS FOR CONCENTRATING SULPHURIC ACID.—Daniel Ashworth and Robert B. Eaton, Woburn, Mass.

We claim, 1st. Conducting the steam or vapors from the retorts to the oil of vitriol chamber, for the purpose and in the manner substantially as described.

2d. Cooling the concentrated oil of vitriol and heating the vitriol before its concentration, by passing the same around or through a vessel, I, constructed as described.

3d. Constructing the pan, c, with tubes or flues, d, for the purpose specified.

4th. Conducting the acid from one retort to the other, by means of siphons or tubes, as described.

5th. Constructing the retorts of platinum, or partly of platinum and partly of glass, when the same are arranged in a series and communicate with each other, as set forth.

78,430.—APPARATUS FOR CONVEYING AND DUMPING COAL.—Henry C. Clark and Robert B. Little, Providence, R. I.

We claim, 1st. The construction of a conveying and dumping apparatus or bucket, A, with a hinged front gate, B, and stop, a, attached thereto, and operating substantially as herein shown and described.

2d, The clasp, F, for securing the rope, C, to the truck, D, said clasp consisting of two plates, c and d, hinged and locked together, substantially as herein shown and described.

3d, The adjustable carriage, G, running on the outer edge of the track, E, and holding the dumping ball, H, suspended by a chain or cord, n, the said carriage being free to be moved upward on the track, substantially as and for the purpose herein shown and described.

4th. A coal conveying and dumping apparatus, consisting of the bucket, A, having the hinged front, B, with the stop, a, of the rope, C, clasp, F, truck, D, carriage, G, and bail, H, all combined with each other, and made and operating substantially as herein shown and described.

Gudit about Minerals, &c.

☞ A new English invention is an apparatus for employing electricity, in connection with a thermometer, to regulate the temperature of a room. An ordinary mercurial thermometer is provided with a platinum wire inserted in the glass bulb, so as to be in connection with the mercury. Another wire, capable of elevation or depression, is placed at the other end of the thermometer. These two wires connect with the two poles of a battery, and forming part of the circuit is an electro-magnet, whose armature controls the opening or closing of a valve regulating the admission of hot air. If it is desirable that the temperature of the room should not rise above 60° Fahr., the point of the movable platinum wire is brought to that number on the thermometer. When the mercury registers sixty degrees, the circuit is closed, and the armature of the magnet closes the hot-air valve, until the temperature becomes reduced, when the valve is again opened. Thus a nearly even temperature may be maintained—a very desirable object in hot-houses.

☞ At a recent sitting of the Paris Academy of Sciences, Palmieri of Naples sent in a communication on the eruption of Mount Vesuvius, which seemed to be on the decline a short time ago, but which, he says, now seems to have settled down into a state of permanence, emitting a little lava every day, a maximum and minimum being perceptible at certain stated hours. A fissure about four hundred yards long opened a few days ago exactly at the spot where tourists leave their horses in order to make the ascent. From this new gap a quantity of lava kept flowing quietly for seven days, and now the stream has recommended from the crater

☞ M. Galy-Cayalat of France has invented a process for making sound steel castings by means of gaseous pressure applied to the metal as soon as it is poured into sand moulds inclosed in iron flasks. The pressure is generated by exploding about a quarter of an ounce of a powder consisting of 80 parts of saltpeter and 20 parts of pulverized charcoal. It is said the invention has been successfully applied in France in the casting of steel cannon.

☞ The Bullion shipments from the port of Mazatlin, for the past four months, ending with April, are estimated at two millions of dollars. The American shipments at one hundred thousand dollars.

☞ Work on the Portage Lake and Lake Superior Canal, under the superintendence of Mr. Howard, is being vigorously prosecuted. The dredge is now in constant use day and night.

☞ A new telegram line has been established between Guadalajara and Zapotlarejo, Mexico.

☞ A vein of copper ore has recently been dissovered in Madison, Maine

All Sorts.

☞ A learned professor in a New England college was accustomed to demand of the students an excuse whenever they were dilatory at recitation. The excuse given, he invariably added:
"Very well; but don't let it happen again."
One morning a married student happening to be behind time, was promptly interrogated as to the cause. Slightly embarrassed, he replied:
"The truth is, sir, I had an addition to my family this morning, and it was not convenient to be here sooner."
"Very well," replied the professor, in his quick, nervous manner; "very well, but don't let it happen again?"

☞ The following epitaph was written on an old locomotive:
Collisions four
Or five she bore:
The signals were in vain;
Grown old and rusted,
Her boiler busted,
And smashed the excursion train.

☞ Ladies will be pleased to hear that a process has been discovered by which they can electroplait their hair.

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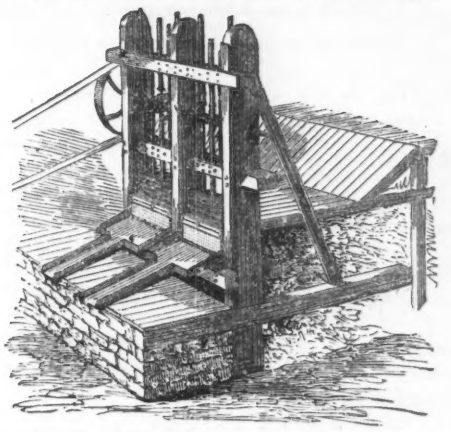

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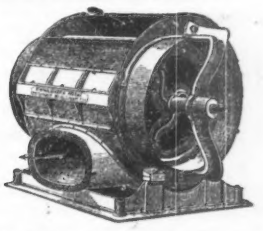

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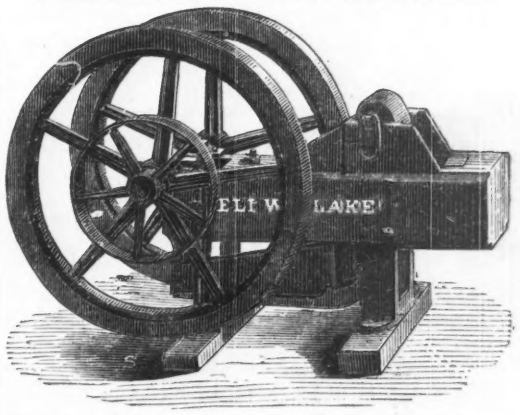

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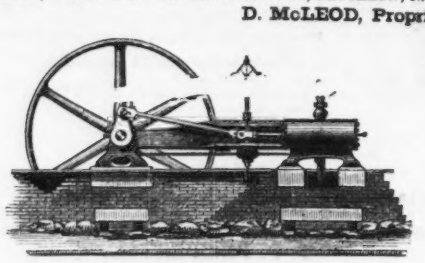

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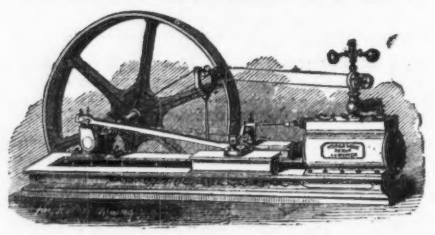

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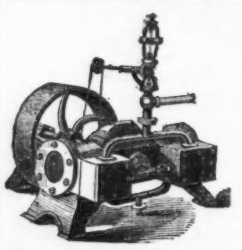

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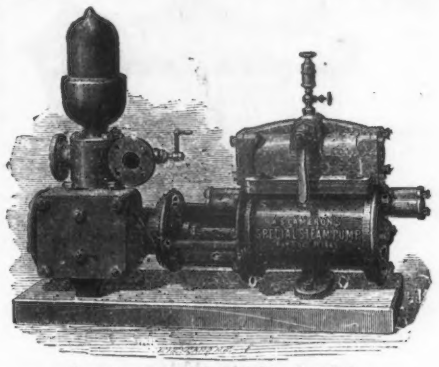

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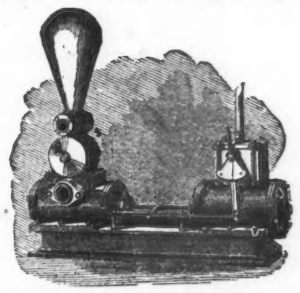

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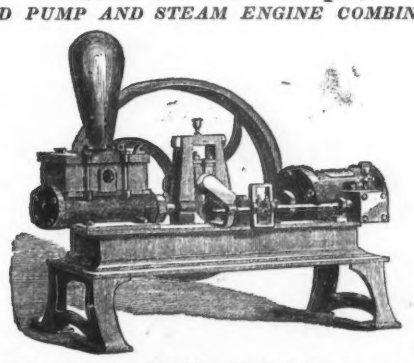

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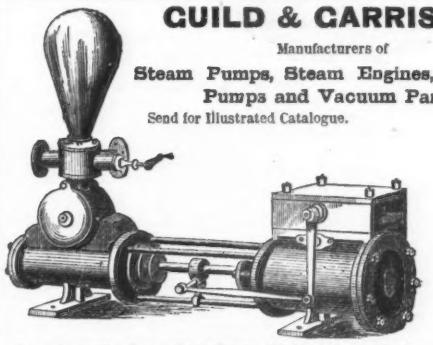

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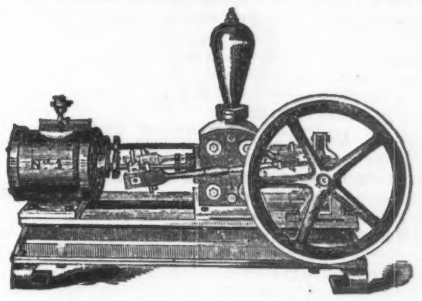

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First Mortgage Bonds

upon such a property, costing nearly three times their amount,

Are Secure Beyond any Contingency.

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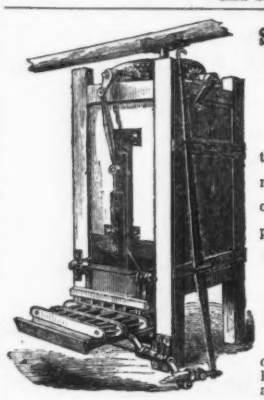

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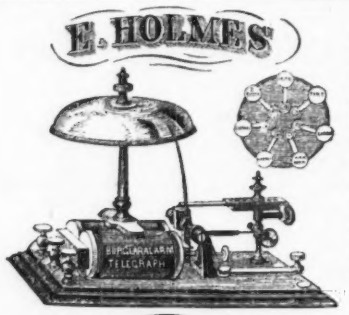

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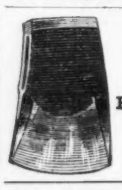

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To that portion of the people, therefore, who believe in a stable government, good men, good laws, and equal and exact justice, we shall continue to appeal for that measure of public favor which is due to the principles we avow.

The year 1868 will be the most important in the history of the Government. It will test the right of the white race to rule the country, and whether the American people have the power to resist the purposes of a Jacobin and lawless Congress to give the negro supreme control over nearly one-third of the States and millions of people. This issue is to be decided at the Presidential election in 1868, and we invoke the aid of all who believe in the Government of the Fathers and in the supremacy of the white race.

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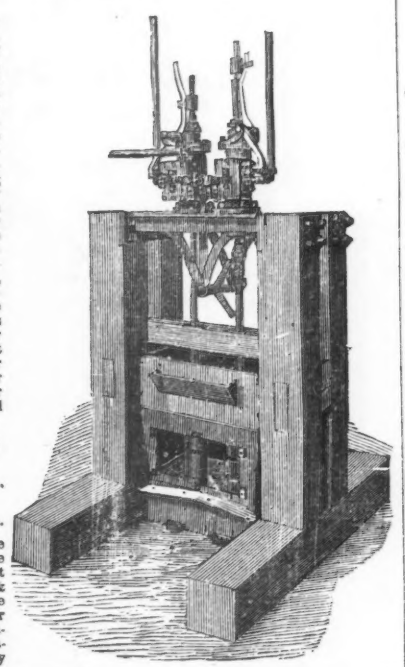

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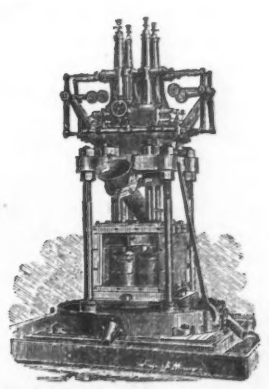

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The American reader will no doubt be glad to get a glimpse of the "Industrial resources of the United States," as seen from an English point of view. The following lines, clipped from the columns of the London *Mining Journal*, will afford an opportunity: The continual extension of English enterprise in foreign countries causes considerable interest to attach to every account of the industrial resources of a country, more especially when it emanates from a reliable source. In connection with Anglo-American commercial affairs, probably few firms enjoy a higher reputation than Messrs. Belding, Keith & Co., the American bankers and merchants of Lombard street, so that their valuable little volume (published by Messrs. Cassell, Petter & Galpin), entitled "A Shilling's worth of the United States of America," will be readily accepted as reliable, and referred to with advantage both by those engaged in mercantile transactions with America and by speculators and investors. From the admirable historical sketch of the States and Territories of the United States much information may be gleaned of considerable interest to the mining community, as well as to those engaged in manufactures. Thus, it will be learned that in the State of New Hampshire there are important manufactories for locomotive engines and other machinery at Manchester and Nashua, and similar information can be gained respecting the various other branches of industry in the several States and cities. With regard to the Pacific States, the mining statistics are very ample; and considering that the resources of those States have been comparatively unknown to Englishmen, they are likely to prove extremely useful. In California mining is the most prominent industrial pursuit; it employs more men, and pays a larger average wage, than any other branch of physical labor. The mines now wrought are of gold, silver, quicksilver, copper and coal. Ores of tin, lead, and antimony, beds of sulphur, lakes of borax, alum, and springs of sulphate of magnesia are likewise found. The gold mines, however, are the most important, the annual yield of gold being about £8,000,000. The aggregate amount taken from the mines is estimated to have been about £143,443,283. Nearly all the copper ore, and a great deal of the valuable gold and silver ore, is sent to Great Britain to be worked. Gold is found in various parts of southern Oregon, and silver, lead, and copper in the Cascade Mountains; coal deposits of great value have been discovered, with alternate layers of gypsum; and, from the surveys which have been made, it is believed that an inexhaustible supply of both can be obtained. The mineral resources of Nevada and Colorado have been so frequently referred to in the *Mining Journal*, that it is unnecessary to give Messrs. Belding, Keith & Co.'s account of them, especially as sufficient has already been given to enable an idea of the general character of the work to be formed. "A Shilling's Worth of the United States of America" is entitled to much the same position, in connection with the negociable securities of the United States, as is enjoyed by "Fenn on the Funds," with regard to those negociable in the markets of Great Britain, and will, no doubt, obtain an equally enviable reputation.

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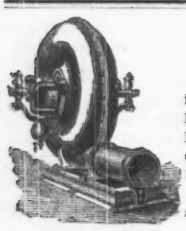

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